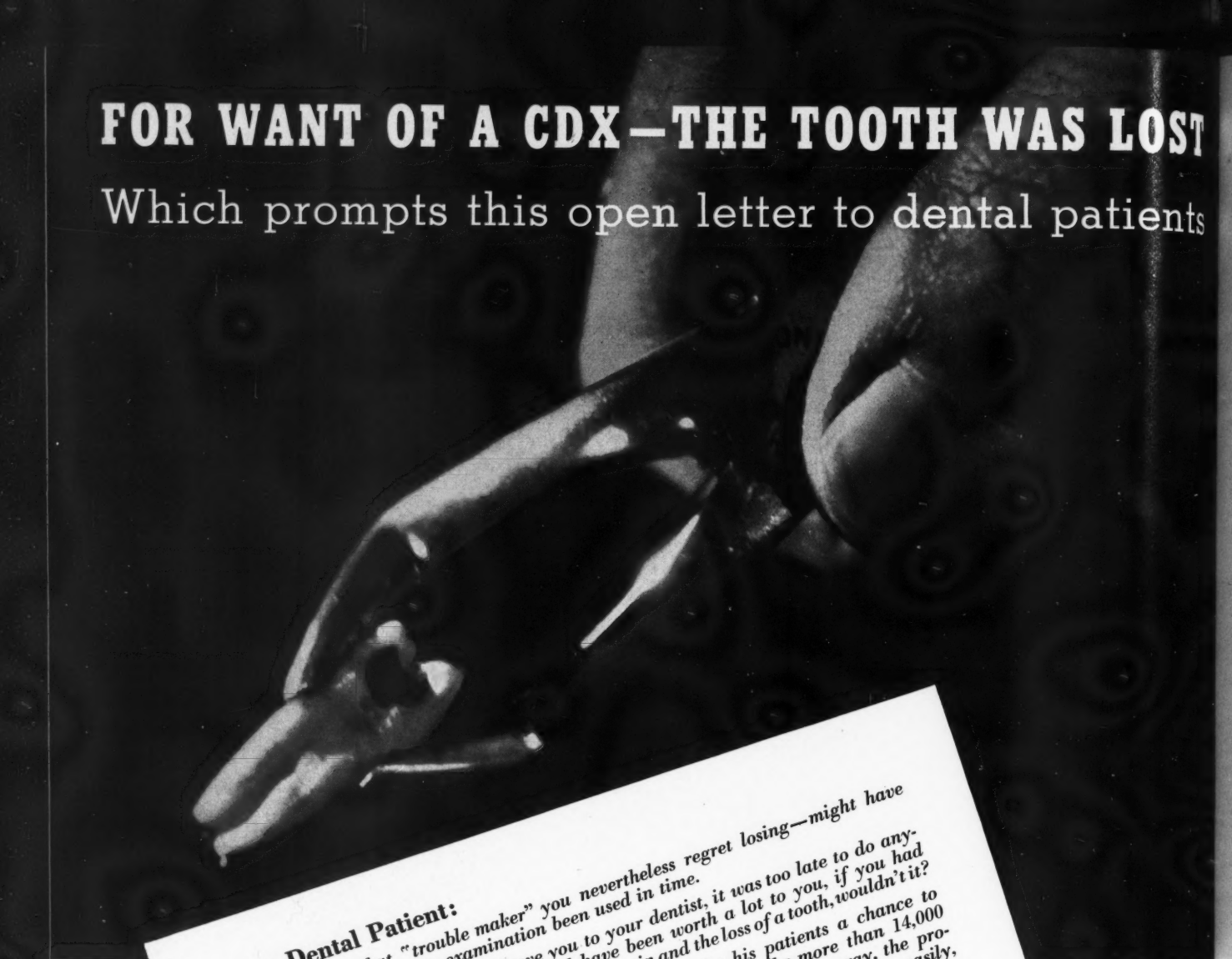
THE DENTAL DIGEST

SEPTEMBER, 1937

FOR WANT OF A CDX—THE TOOTH WAS LOST

Which prompts this open letter to dental patients



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JULIEN GARFIELD MANSER (A.B., 1926, Southwestern College; D.D.S., 1930, St. Louis University), co-author with Doctor Raper, was a member of the U. S. Public Health Service for four years, including one year in Alaska aboard the Coast Guard Cutter, Northland. Doctor Manser is a member of the American Dental Association and practices general dentistry.

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708 Church Street, Evanston, Illinois

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A New Type of Fixed Bridge

ARMAND M. OPPENHEIMER, A.B., B.S., D.D.S., New York

WHEN ITS USE IS indicated the fixed restoration approaches most satisfactorily the efficiency and comfort of natural teeth. Normal interproximal contour, porcelain ridge-lap, and correctly carved buccal, lingual, and occlusal surfaces eliminate the major hinderances to oral cleanliness. Nevertheless the fastidious wearer of a fixed bridge can clean it effectively only by threading dental floss through the interproximal space. This is difficult and, therefore, generally neglected.

The Floss-Lock Bridge

By utilizing a new principle in the construction of movable-joint, fixed appliances a bridge can be made with a "flossable" interrupted joint. Strong, hard golds are required to withstand the stresses upon the working parts of the joint. The slight additional labor involved in construction is well rewarded. Dental floss can be passed through the lock and drawn underneath the pontic to the fixed abutment, thus cleaning otherwise inaccessible areas as well as the margins of the abutments.

The restoration is of the type known as "fixed-movable" which I prefer to term movable-nonremovable. It incorporates all the advantages of the fixed bridge and in addition the new improvement it offers. Its use is limited to one-tooth restorations.

The novel features of the appliances are found in the interrupted joint or "floss-lock." This consists of two members. The male part is designed to be carried on the proximal surface of the pontic and may be described concisely as a hook (Fig. 1). The female part (Fig. 2), to be formed in the approximating face of the abutment casting, consists of a recess to receive the male section and two lateral channels to be described. The male and female sections interlock in such a manner that no vertical, horizontal, or lateral displacement is possible after the bridge is cemented in the mouth; nevertheless dental floss may be passed freely through the joint in one direction—from occlusal to cervical margins.

Preparation of the Abutments

The preparation of the abutment tooth selected to support the fixed end of the bridge presents no new features; however, it is important that good retention be secured.

The abutment at the movable end, however, must be prepared so that a thickness of metal of at least 1.5 mm. will be available in an area at least 2 mm. wide in the occlusal third of the proximal surface of the casting. If the slice preparation is used a modification will be necessary (Fig. 3).

It is advisable to make this casting by the indirect method, preparing the base of the die carefully, as shown in Fig. 3, so that it may be used as a removable tooth in the master model. Otherwise it will be necessary to make a removable seat for the casting by any of the accepted methods when later constructing the master model.

After the abutment castings have been tried in the mouth, adjusted for occlusion and finished, they are replaced accurately in position in the abutment teeth and a plaster impression is taken. A similar impression of the occlusal surfaces of the opposing teeth is secured, as well as a bite registration, and the shade of the teeth noted.

Laboratory Technique

A fusible metal seat is poured for the casting designed to bear the fixed end of the bridge. The die which was used to form the casting selected to bear the female portion of the floss-lock is now utilized to provide a removable seat for that casting on the master model. Its base having been well lubricated and carefully keyed, the die is placed accurately into position in the impression. A small quantity of sticky-wax is used to hold it firmly in position. The impression is then treated with separating medium and poured in stone. The opposing teeth having been duplicated in fusible metal, the casts are articulated as shown (Fig. 4).

Preparation of the Female Part

1. The die, carrying the casting, is removed from the model.

2. With a number ½ round bur a shallow depression is drilled in the center of the proximal surface of the casting close to the occlusal margin (Fig. 5).

3. The bur is then inclined at an angle of 45 degrees and a pocket is cut to a depth of at least 1.5 mm. and extended bucco-lingually at least 2 mm. (Fig. 6).

4. A fine, tapered fissure bur is next used to cut two channels, one at the bucco-gingival aspect, the other at the linguo-gingival aspect of the pocket, each inclined laterally and gingivally from the floor of the pocket (Figs. 7 and 8).

5. The pocket and channels are then carefully finished, all rough surfaces milled, and the margins of the orifice rounded and polished. When thus finished the pocket should admit at least a number 1 round bur to its full depth. This minimum size should be increased in proportion to the available space; however, the inclination of the recess must be retained and the preparation confined to the occlusal third of the proximal surface.

The Pontic

The die and casting are replaced on the model and the selected facing is prepared for the case. Porcelain-tipped facings are obviously indicated. The porcelain is adapted accurately to the ridge to form a saddle-shaped ridge-lap. The buccal surface of the facing is now finished and the porcelain is glazed.

Preparation of the Male Part

At this point there is a choice of two methods. The first to be described is more in the nature of a shortcut:

First Method—1. A small piece of inlay wax is softened and an accurate

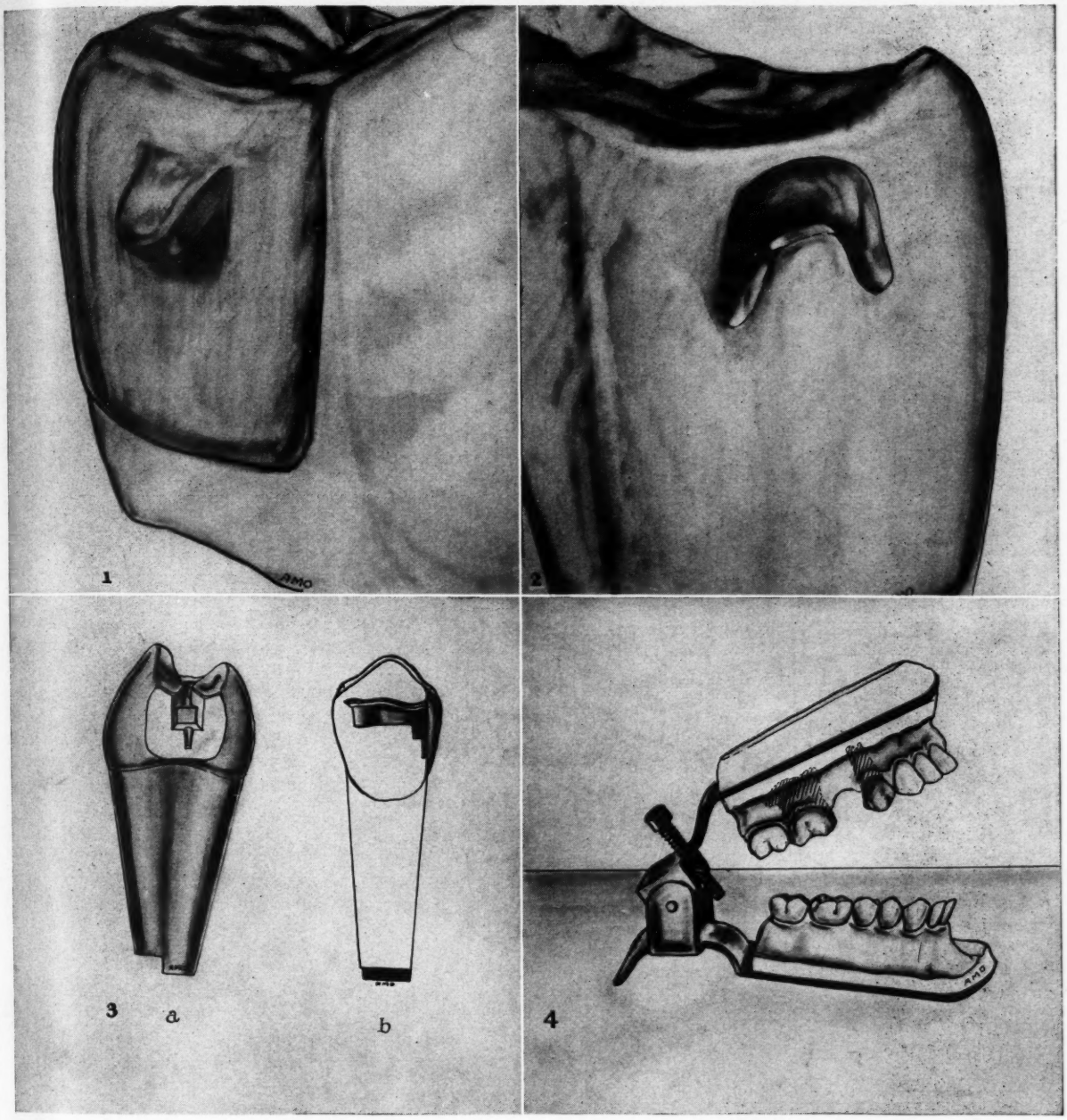


Fig. 1—The male section of the "floss-lock" interrupted joint.
Fig. 2—The female section of the "floss-lock," showing the pocket and lateral channels formed in approximating face of abutment casting.
Fig. 3—a, The die, showing the tapering base and the modified slice preparation; b, side view of casting made by indirect method, with outline of die showing depth of preparation.

Fig. 4—Articulated master model; fusible metal seat and removable die, the invisible bases of which are indicated in inked lines.

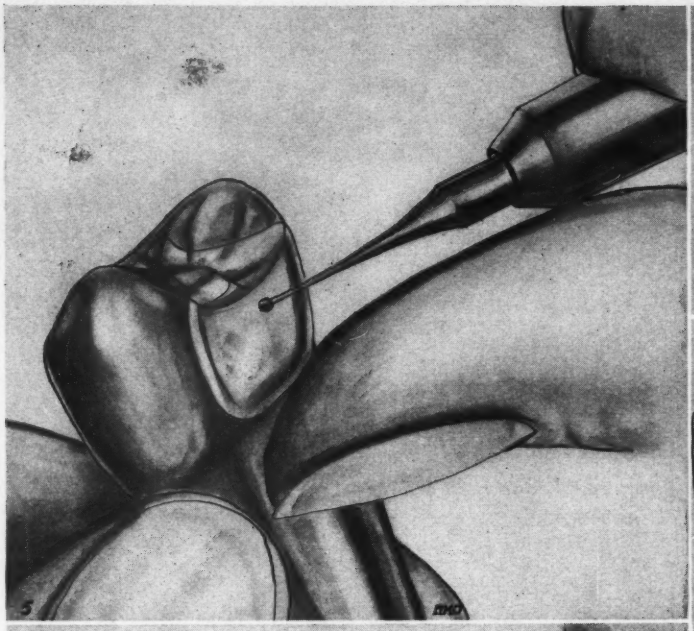
impression of the female portion of the lock is secured. The wax will present an impression, not only of the main pocket of the female portion but also of the lateral channels. The wax filling the channels will appear later in the casting as "wings" on each side of the hook. These "wings" must be ground off at the proper time.

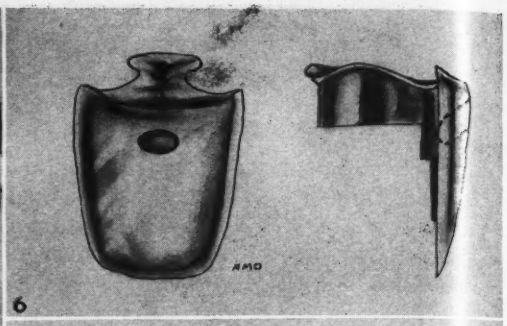
2. When a perfect impression has been secured, it is replaced in position and trimmed almost flush with the surface of the casting.

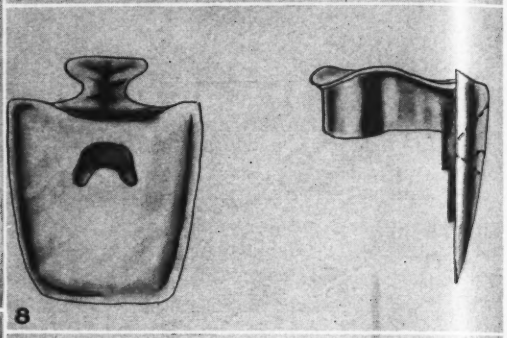
3. The die, with its casting and the contained pattern of the male portion, is returned to the model.

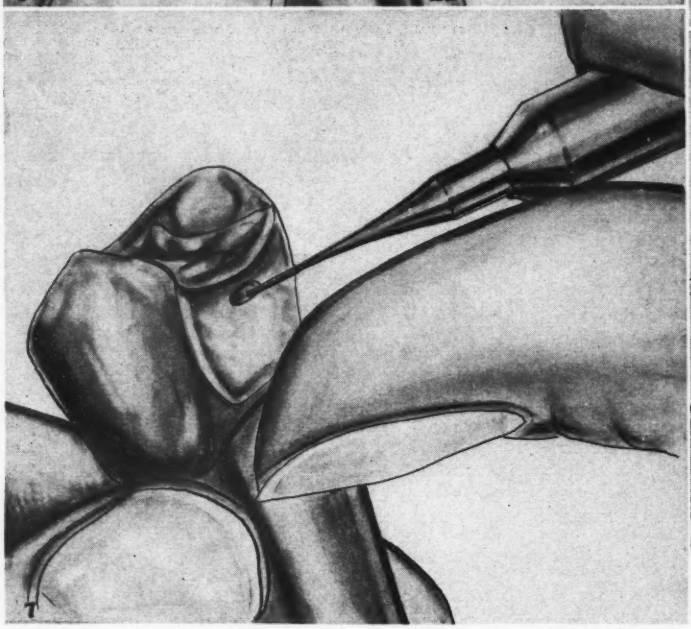
4. The pontic is waxed-up, and, the pontic being held in correct position by a plaster core, the pattern of the male portion is sealed to the wax pattern of the pontic.

5. The die and pontic are then carefully lifted out of the model together, the wax is removed, and the pontic









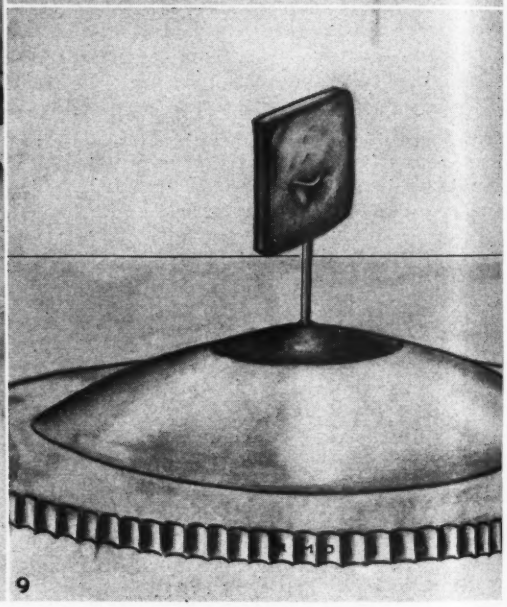


Fig. 5—With a number ½ round bur a shallow depression is cut in the midline of the proximal surface, close to the occlusal margin.

Fig. 6—The bur is inclined at 45° angle and a pocket is cut to a depth of at least 1.5 mm. and extended bucco-lingually at least 2 mm.

Fig. 7—A fine tapered fissure bur is next used to cut two channels, one at the bucco-gingival angle, the other at the linguo-gingival angle of the pocket, each inclined laterally and gingivally from the floor of the pocket. Confine to occlusal third of proximal surface.

Fig. 8—The female part finished, admitting number 1 round bur.

Fig. 9—Wax pattern of the male part ready to be cast. Sprue attached.

and lock are then cast in one piece.

The second method is much more certain to give accurate results:

Second Method—1. The wax pattern of the male portion is formed as described but is cast separatelv.

2. The sprue former is attached as shown in Fig. 9, so that when cast, part of the sprue may be retained as an extension (Fig. 10).

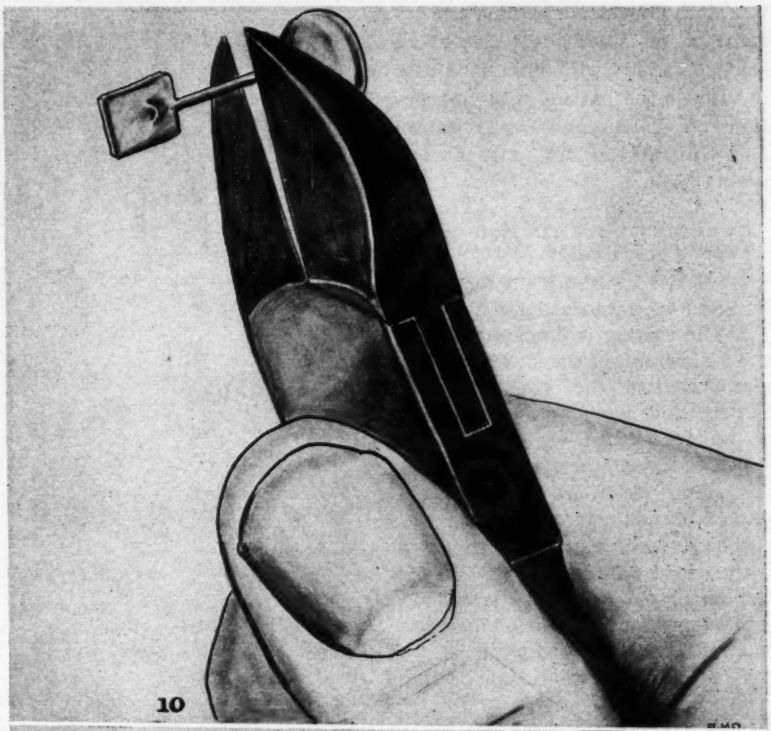
3. The casting of the male portion is examined under a magnifying lens or binocular loop for minute bubbles which must be removed.

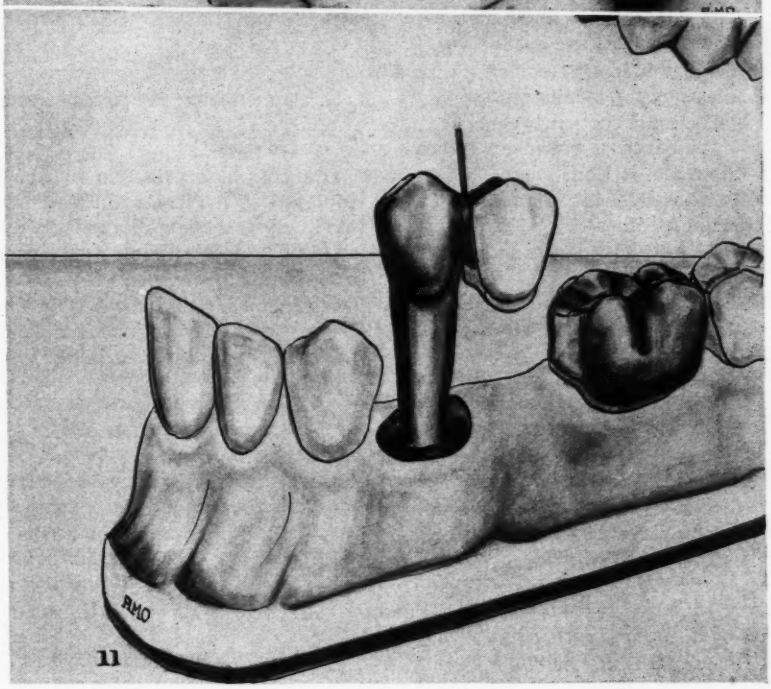
4. It is then locked into the female member and placed in position on the master model.

5. The pontic is waxed-up and

Fig. 10—The button is removed from the male casting, part of the sprue being retained as an extension.

Fig. 11—The pontic is waxed-up to the casting of the male part. The pontic and male section are then carefully removed together, invested, and the pontic is cast to the male section.





sealed to the casting, whereupon they are carefully removed as illustrated in Fig. 11, the pontic being cast to the lock.

The union of the two parts is insured, after the casting has been tested for accuracy, by the application of a minute quantity of 22 K. solder to the junction in the free flame.

6. The sprue extension, having served its purpose, is removed.

Assembling the Bridge

The several parts of the bridge are placed in position on the master model and fixed with sticky-wax. The pontic is waxed to the fixed abutment and a plaster core formed over the occlusal surfaces of the pontic and abutment. The pontic and abutment casting are placed in position in the core, waxed, and invested. When the investment has set the plaster is chipped away and the wax removed with a stream of boiling water. The joint is then soldered in the usual manner with 22 K. solder.

Removing the "Wings" on the Male Casting

The "wings" on the male casting have been retained up to this point in order to facilitate the accurate assembling of the several units of the bridge. Since they would entirely occlude the lateral channels of the female unit and thus prevent the passage of floss through the lock, these "wings" must be entirely removed. This is accomplished with a knife-edged stone. The hook-like process of the male unit is then carefully finished and polished (Fig. 12).

Inserting the Bridge

After the bridge has been tested for occlusion in the mouth, the margins of the abutments have been finished, and all parts thoroughly polished, the lock should be tested with floss. If the floss tears, the lock must be examined for rough edges. If the floss can be passed through the lock only with difficulty, slight polishing of the male section may be necessary. When all adjustments have been completed the bridge may be cemented in place. It is important that the cementation be carefully and thoroughly accomplished. All parts of the bridge must be cemented simultaneously. In order to prevent the entrance of cement into the lock, I seal the male portion into the female portion with carding

wax. It is imperative to allow the cement to set thoroughly before the bridge is tested with floss. It is wise to dismiss the patient with instructions not to attempt to pass dental floss through the lock until the following day.

Summary Construction of Floss-Lock Bridge

1. Prepare the abutment for retention and accommodation of the lock.
2. The casting is prepared to bear the female unit of the lock by the indirect method, the other abutment casting being done by either the direct or indirect method.
3. A plaster impression and an opposing impression are taken, and the bite and shade determined.
4. The master model is constructed with the die as a removable seat for the casting to bear the attachment, and a fusible metal seat for the casting to bear the soldered joint.
5. The recess of the female portion is cut.
6. The lateral channels of the female attachment are cut.
7. A porcelain-tipped facing with a saddle ridge-lap is constructed.
8. The male section is cast.
9. The pontic is waxed-up and cast to the male portion.
10. The bridge is assembled and the fixed joint soldered.
11. The "wings" on the male casting are removed.
12. Final polishing is done.
13. Trial and adjustment are made in the mouth.

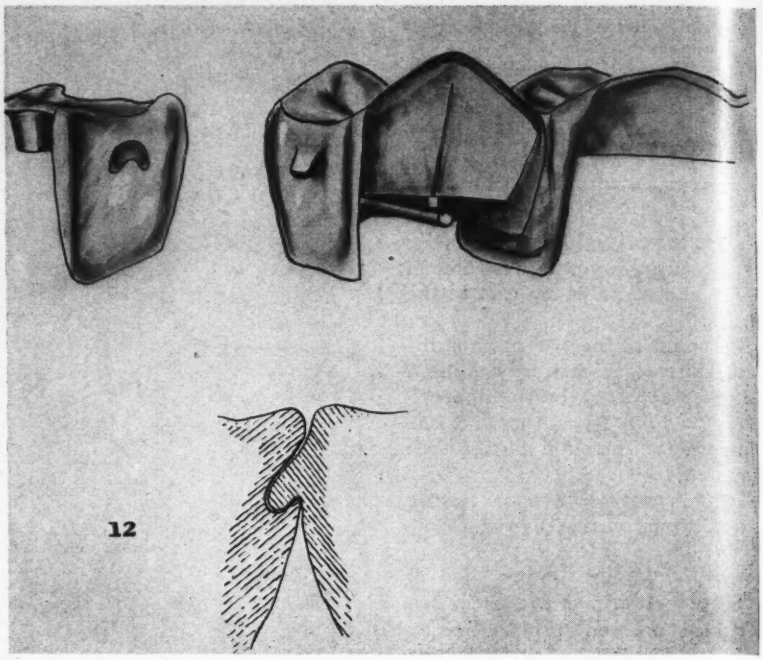


Fig. 12—The wings are ground away from the male casting, the metallic parts of the bridge are carefully polished, and the appliance is then ready to be tried in the mouth.

14. Cementation is the final step.

Conclusion

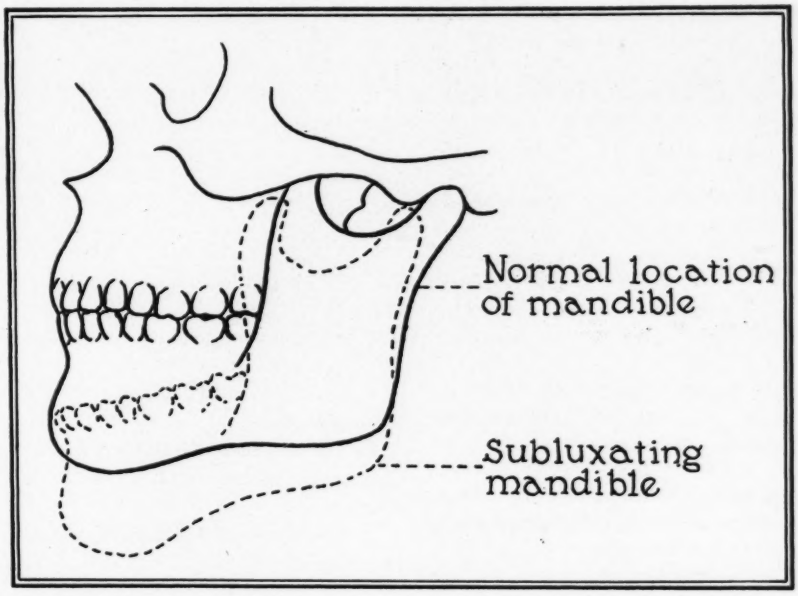
The floss-lock principle has been employed with success and satisfaction in my practice for more than five years. It finds a valuable application in the splinting of teeth where interlocking inlays are indicated in the treatment of periodontoclasia, or in the fixation of teeth that might tend to drift or erupt out of normal position. The floss-lock may be used in modified porcelain bridges as well as in each unit of complex restorations wherever an interrupted joint is feasible. Hygienically, it is a distinct advance toward the ideal in the construction of dental bridgework.

119 *West Fifty-Seventh Street.*

Treatment by Injection for Subluxation of the Temporomandibular Joint*

LOUIS W. SCHULTZ, D.D.S., M.D., Chicago

SUBLUXATION OF THE temporomandibular joint is a frequent occurrence. The condition is often painful, and an annoying click or snap of the jaw, or dislocation may occur. The causes are numerous: (1) congenital weakness of the capsule; (2) malformation of one or both condyles; (3) strain or injury of the joint during a general anesthesia for operations in the mouth or throat; (4) yawning; (5) attempts by children to insert large objects into the mouth; (6) positional pressures during sleep; (7) malocclusion.



Methods of Treatment

To safeguard a subluxating joint from undue motion for one whole year by bandaging has been impossible. The best known treatment consists of rest. Surgery has been attempted with some success by the use of mattress sutures inserted laterally through the capsular ligament, or by the removal of the meniscus. Physiotherapy has been widely but ineffectively employed. Orthodontic appliances and prosthetic devices; pressure pads in front of the ears, held in place for several months by a steel spring passing over the calvarium; wiring the jaws in occlusion and bandaging the jaws for months at a time—all these procedures have been tried, and found to be only partly successful; most of them are awkward, uncomfortable, and incapacitating. Changing the bite has been and is practiced with some success when malocclusion is the cause.

Injection Method—The object of the investigation reported here was to find a more practical and effective method to provide relief and, if possible, a cure. Attention was directed to the development of a simple method of shortening or stiffening the capsule of the joint. Injections have been used in the treatment of hernia,[1] and recently a great deal of clinical and experimental work has been done with sclerosing agents. Injection, therefore, seemed to be the most promising means to attain this end. Fibrogenesis in the capsule of the joint was the result sought.

Effectiveness of Sodium Psylliate—In all, Rice[2] treated more than 600 cases of hernia with various solutions. The results were discouraging except when he used sodium psylliate which gave favorable reactions without producing ill effects. He concluded that this solution furnished the best method of developing fibrogenesis in the treatment of hernia.

Analysis of Seed of Psyllium—Pendse and Dutt[3] of India carried out extensive investigations on the chemistry of the seed of psyllium or plantago ovata. They found the seed to have a large content of mucilage but no alkaloids or glucosides. Analysis revealed oleic acid, 36.75 per cent; linolenic acid, 0.244 per cent; linoleic acid, 47.95 per cent; palmitic and stearic acids, 12.5 per cent; sitosterol, 2 per cent; some elaidic acid, and a 5 per cent pale yellow, semidrying oil.

Animal Experimentation

In view of Rice's results I[4] decided to test some of the reagents, among them sodium psylliate, upon the temporomandibular joint of ani-

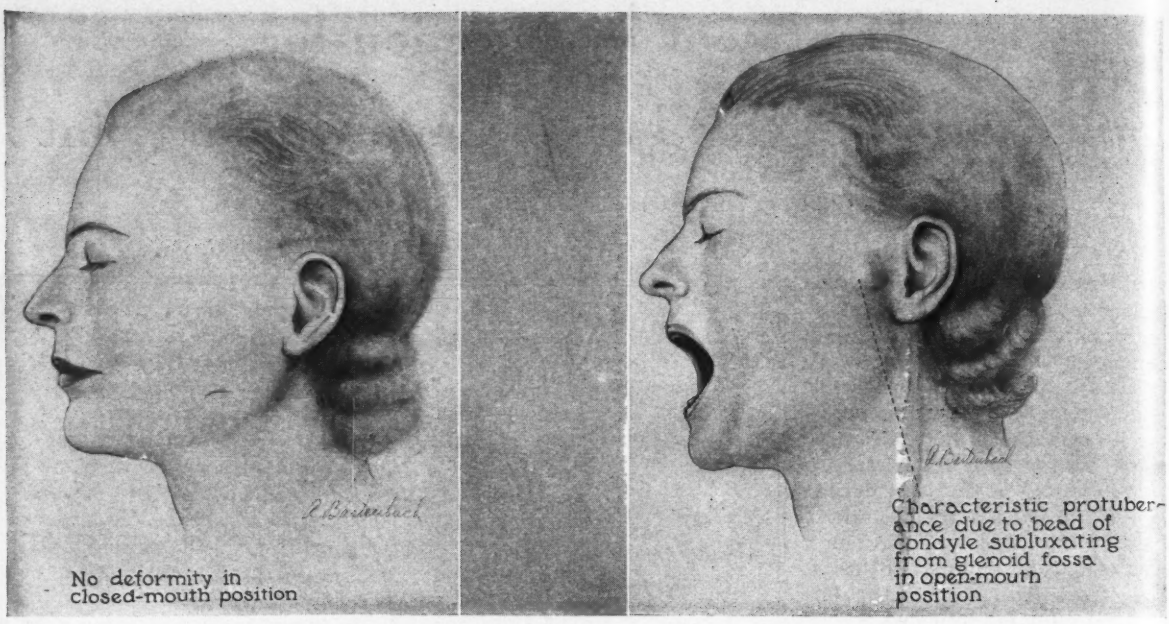
*From the Department of Surgery, College of Medicine, University of Illinois, The Illinois Research and Educational Hospital, and the Department of Public Welfare, Chicago.

[1]McDonald, G. A.: Ambulant Treatment for Hernia, Ill. Med. Sec. J. 48:399 (November) 1925. Mestre, Pin: Las Injectiones Proliferantes Obrutadoes en las Hernias, Abstr. J. A. M. S., Spanish Edition, 18:186; also, J. A. M. A. 94: 339. Mayer, Ignatz: Treatment of Hernia by Subcutaneous Injections, Med. J. & Rec. 125: 528; 128:415; 131:90, 1927. Wyss, Franz: Die Behandlung der Hernien mit Alkohol-injectionen, Schweiz. med. Wchnschr. 59:85 (January 26) 1929. La Rochelle, F. G.: Treatment of Hernia with Special Preference to the Injection Method, Am. J. Surg. 16:501; Injection Treatment of Hernia, Med. J. & Rec. 136:184, 1932. Batrud, A. F.: Ambulant Treatment of Hernia, Minn. Mex. J. 16:446 (June) 1933.

[2]Rice, C. O.: Technique for the Injection Treatment of Hernia, South. Surg. 5:227, 1936; The Rationale of the Injection Treatment of Hernia, South. Surg. 18:823, 1936.

[3]Pendse and Dutt: Proc. Acad. Sc. (United Agra Oudh, India) 4:133, 1934; 29:7577, 1935.

[4]Schultz, L. W.: A Treatment for Subluxation of the Temporo-Mandibular Joint, J. A. M. A., to be published.


No deformity in closed-mouth position
Characteristic protuberance due to head of condyle subluxating from glenoid fossa in open-mouth position

mals. Sodium morrhuate, Thuja solution, and Mayer's solution were some of the other substances tried, but this article is concerned only with the results obtained with sodium psylliate which met the requirements desired in the agent.

Requirements of Agent—At the outset of the experiments I determined that the agent must meet the following obvious requirements, if it is to be applied therapeutically in man: 1. It must not be injurious to the joint or surrounding tissues.

2. The therapeutic response should be painless.

3. The solution should not be injurious if, by chance, it entered the veins.

4. The degree of fibrogenesis should be controllable.

5. No untoward systemic reaction should follow.

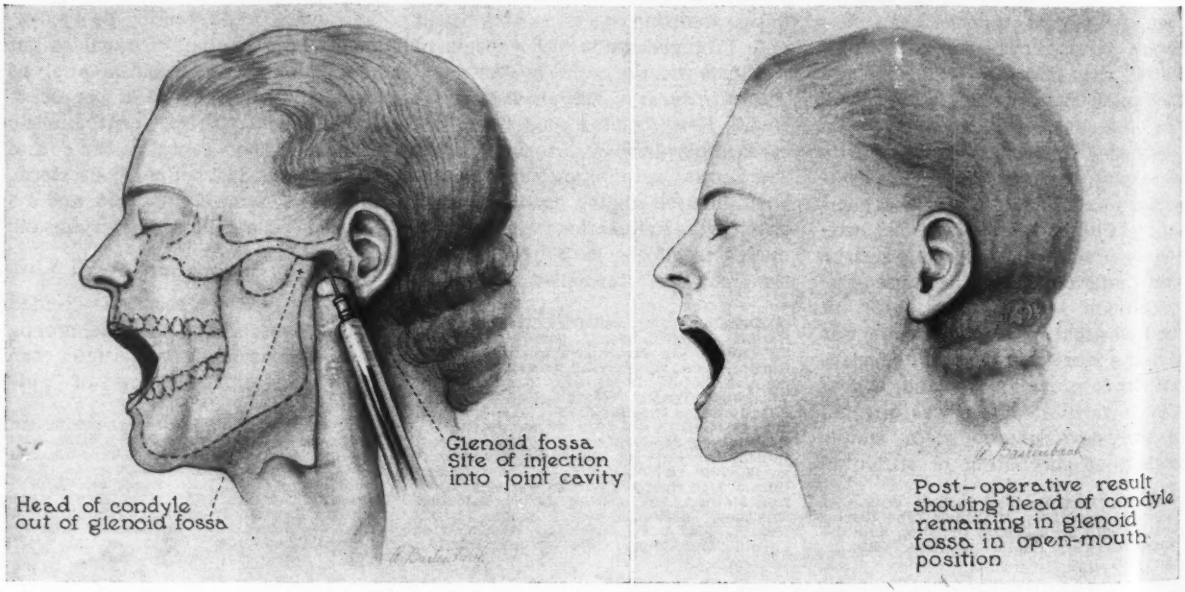
Some of the foregoing requirements, in whole or in part, were also expressed by Rice in his demands for results in the treatment of hernia.

Conclusions Drawn from Animal Experimentation

The harmlessness of treatment with sodium psylliate, and the quick results obtained convinced me that it was the agent of choice in the treatment of subluxation of the temporomandibular joint by injection.

The animal experiments demonstrated: 1. No alteration of the joint cavity, the fibrosis occurring in the ligaments.

2. No gross changes in the liga-


Head of condyle out of glenoid fossa
Glenoid fossa
Site of injection into joint cavity
Post-operative result showing head of condyle remaining in glenoid fossa in open-mouth position

ments other than their thickening, and hence the strengthening of the chief factors that hold the joint within its cavity.

3. Subacute reaction following thirty minutes after the injection of sodium psylliate.

4. Infiltration of leukocytes at this time (that is, during the subacute reaction).

5. Two or three hours later a lymphocytic infiltration starts.

6. Fibrosis of this tissue starts in from four to six days.

7. Injections into the joint cavity caused some discomfort.

8. Large doses injected directly into the blood stream were not followed by any symptoms.

9. Injections into the heart did not produce any recognizable effects.

10. No infection followed the treatment.

Technique

No injection is made until a complete history is obtained, and an examination of the joint, of the occlusion, and careful clinical observation of the external auditory meatus and drum head give assurance that the treatment is indicated.

1. The ball of the index finger is placed in front of the tragus, and the patient opens the mouth wide enough to cause the head of the condyle to subluxate, "click," or produce an abnormal movement of the fibrocartilaginous disc.

2. The needle is inserted into the joint cavity and from .25 cc. to .5 cc. of the solution is deposited inside the capsule. This diffuses through the joint.

3. The injections are repeated weekly or biweekly on both joints until a sufficient fibrosis is obtained. This occurs in from three to five weeks. The injections, therefore, number from three to four at the intervals stated.

The technique of injection should not produce more disturbance than the prick of the needle, and a slight feeling of fullness at the time of the injection. Pain usually follows twenty or thirty minutes later, when the patient may be given a sedative, or an anodyne may be applied to the parts involved.

The operator should remember that this region contains many important structures, such as the internal maxillary and internal carotid arteries, the middle and internal ear, the brain, the parotid gland, and the facial nerve. The injection should, therefore, proceed with due caution.

Conclusions

1. Stabilization of joints by injection therapy is successful.

2. Sodium psylliate is a dependable fibrosing agent.

3. It is noninjurious to tissues generally.

4. In experienced hands, it is relatively harmless and office therapy is possible.

5. It produces no apparent, systemic disturbances even when injected intravenously into animals.

6. The fibrosis obtained by the injection of the temporomandibular joint for subluxation persists long enough to restore the joint to normal function.

7. The method of treatment comes within the scope of the general practitioner.

8. During the last year I have treated by injection more than thirty persons with temporomandibular subluxation, with results that approach entire satisfaction.

9. It appears logical to assume that the principle herein described, thickening and shortening of the joint capsule by injection of a fibrosing agent, might be applied therapeutically to other joints with success.

25 *East Washington Street.*

Treatments Used in the Control of Vincent's Infection

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THE MEDICAMENTS USED in the treatment of Vincent's infection are many, as a study made of the literature published since 1918 reveals. The question naturally arises as to the cause of this multiplicity of methods of treating a single disease entity. The numerous procedures used indicate that the disease is not completely understood and that its potentialities are underestimated. One may still read dissertations in recent publications in disagreement about the seriousness of the disease, its contagiousness, and its method of progression. Such arguments confuse the dentist who is well aware from practical experience of the viciousness of the disease and is puzzled as to how to treat the actual cases under his care best.

The bacterial nature of the disease is shown by the numerous types of antiseptics which are used and in most cases these drugs or combinations of drugs produce good results. For this reason a complete tabulation of the drugs used today has been made. Every effort has been exerted to make this chart complete, but some drugs have been left out of the list because of their unproved status, and others, because they have not been adequately discussed in dental or scientific literature. No attempt has been made to evaluate these methods of treatment, because each of those mentioned has proved sufficiently satisfactory to have been written about by well known dental authorities. A complete understanding of the use of these drugs and their applications should simplify the treatment of Vincent's infection and make its control easier for the dentist.

National Bank of Jackson Building.

(See charts on following four pages)

OUTLINE OF SUGGESTED TREAT

DRUGS	PREPARATION FOR USE	SPECIFIC AMOUNT SUGGESTED	METHOD OF USE
ARSENICALS:			
Neoarsphenamine	Dilute with 100 to 150 cc. distilled water or 5% glucose solution of equal amount	0.2 to 0.6 Gm.	Intravenous injections. Inject by gravity into superficial vein at elbow.
Neoarsphenamine	Mix with 20% glucose	5% solution	Topically. Apply drug carefully under gum flap with applicator, Vastine cup, etc. Keep saliva from area with cotton rolls or similar means. Retain medicament in place from 5 to 15 minutes.
Arcetone	Solution[2]		Topically
Potassium Arsenite	Solution	1%	Topically
Fowler's solution which is a solution of arsenous acid and potassium carbonate	Formula: Fowler's solution ..... 1 Gm. Glycerin ..... 1 oz. Wine of ipecac ..... 1 dram Hydrogen dioxide, sufficient to make ..... 3 oz.		Topically and as mouth wash
Arsphenamine	Mix into thick paste with glucose or distilled water	From 1 to 10% solution	Topically
Mapharsen (meta-aminoparahydroxyphenyl arsenoxide)	Dilute with distilled water or 5% glucose	From 40 to 60 mg.	Topically
Mapharsen	Dilute in from 100 to 150 cc. distilled water	From 30 to 60 mg.	Intravenous injections starting at 30 mg. after four days

DRUGS	PREPARATION FOR USE	SPECIFIC AMOUNT SUGGESTED	METHOD OF USE
OXIDIZING COMPOUNDS:	Formula: Potassium permanganate ..... 20 gr. Distilled water ..... 8 oz.	1 teaspoon to ¼ glass water	Once an hour as a mouthwash
Potassium Permanganate			
Chromic Acid	From 1 to 7% solution		Topically
Chromic Acid	8% solution		Topically
Chromium Trioxide	Solution	2%	Topically
Cerous-Ceric-Chromate	7% solution	Small amount	Topically
Sodium Dichromate	Formula: Sodium dichromate ..... 5 gr. Boric acid ..... 4 gr. Distilled water ..... 100 cc.	Full strength	Topically
Mercuric Chloride	Solution	1: 1000	Topically
Mercuric Chloride	Solution made with hydrogen dioxide	1: 2000	Mouthwash
Copper Sulfate	Solution	2%	Topically
Potassium Chlorate	Solution	Soluble in 16 parts of water	Topically

[1] ons, D. C.: From the textbook, Bacteriology and Control of Vincent's Infection, to be published.
[2] Wherever the word "solution" is used alone, it indicates a solution made with distilled water.

MENTS FOR VINCENT'S INFECTION[1]

ASSOCIATED TREATMENT IF ADVISED	PRECAUTIONS AND REMARKS	COMMENTS REGARDING ARSENICALS
	Care must be taken not to inject subcutaneously.	It is generally considered that the amount of success with an arsenical depends on the degree of tissue involvement. When organisms are deeply embedded and are in the blood stream, intravenous injections are of particular value. Dyspnea, cyanosis, or collapse may develop in hypersensitive persons.
After application use hydrogen dioxide followed by 5% copper sulfate.	Some advise retaining medication until the patient complains of a burning sensation or pain.	
Follow application with tincture of iodine.	Pack off mouth with cotton rolls. A saliva ejector may be used to remove excess saliva.	
Applied on cotton to surfaces of large ulcers.	Work into pockets and allow to dissolve slowly.	

ASSOCIATED TREATMENT IF ADVISED	PRECAUTIONS AND REMARKS
	The solution breaks down readily. Stains teeth brown.
	Strong caustic. Stains teeth.
Follow topical application with tincture of benzoin.	
Follow with hydrogen dioxide.	Decomposition takes place when chromium trioxide comes in contact with organic compounds.
Wash mouth after use with warm water or saline solution.	Astringent without caustic action of chromic acid. A stable compound. Provides own acid medium for oxidizing.
Add equal amount of water and use three times a day as a mouthwash.	
	Dangerous poison; therefore, not recommended.
Dilute with equal parts of water and use every one or two hours.	
Used following arsphenamine by one author	Must use catalysts for oxidizing action.
	Limited range of usefulness. Dangerous poison.

MISCELLANEOUS DRUGS AND OTHER THERAPEUTIC AGENTS	PREPARATION FOR USE	SPECIFIC AMOUNT SUGGESTED	METHOD OF USE
Bismuth tartrate	Solution	30% emulsion	Paint lesions
Hydronapthol	Formula: Hydronapthol ..... 1 Gm. Alcohol ..... 40 Gm. Methyl salicylate ..... 13 cc. Water ..... 20 cc.		Topically
Calomel (Mercurous chloride)		1/5 to 2 grains	Internally as an alterative
Green soap			Topically
Green soap	Formula: Green soap ..... 1 part Hydrogen dioxide ..... 1 part Water ..... 3 parts		Topically
Sodium Bicarbonate	Solution	10%	Mouthwash
Zinc Chloride	Formula: Zinc chloride ..... 2.6 Gm. Water ..... 30.0 cc.	From 1 to 5% as styptic; 1:3000 as mouthwash	Topically or as mouthwash
Zinc Iodide (Talbot's Iodo-Glycerol)	Mixed with starch or used as solution. Formula: Zinc iodide ..... 12 Gm. Iodine ..... 20 Gm. Glycerin ..... 40 cc. Water ..... 8 cc.		Topically
Metaphen	Solution	From 1 to 10%	Topically
Mercurochrome	Solution	From 1 to 10%	Topically
Sodium Perborate	Solution or Paste	From 2 to 12% solution	Topically and as mouthwash
Camomile		From 1 to 2 tablets to 50 cc. water	Spray on gums
RAYS:		From 2800 to 2900 angstrom band	Produce deep erythema corresponding to sun
Ultraviolet Rays			burn.
Infra-Red Rays			
DIETARY MEASURES			Exclusion of greasy foods, condiments. Controlled use of tobacco.
DYES:			
Neutral Acriflavine		2%	Topically
Crystal Violet		From 1 to 5%	Topically
Brilliant Green		From 1 to 5%	Topically
Methylene Blue		From 1 to 5%	Topically
CAUSTICS or CAUTERY:			
Phenol	Mixed with glycerin	5%	Topically
Silver Nitrate	Crystals and solution	Crystals and solution to 50%	Cauterize ulcers.
Trichloracetic Acid	Crystals and solution	From 1% to concentrated solution	Cauterize necrotic areas.
Zinc Chloride	Concentrated		Topically
Chromic Acid	Crystals	10% or concentrated solution	Apply to surface of ulcers.
Crystals of Chromic Acid Fused to Platinum Wire			Topically
Actual Cautery			Burn tissues carefully, touching only necrotic areas.

FOR VINCENT'S INFECTION (Continued.)

ASSOCIATED TREATMENT IF ADVISED	PRECAUTIONS AND REMARKS
Local application of hydrogen dioxide and boric acid to which 1 drop oil of cassia is added to each 2% of the solution.	Follow with saline cathartic.
	Of questionable value in mouth.
Follow with spray of hydrogen dioxide and rinse with water.	
	Valuable as an associated treatment with other drugs.
	Astringent.
Follow with hydrogen dioxide	
	Use air cooled lamp. Water cooled not efficient nor advised.
	Relieves pain.
	Used by many dentists with considerable success
	Discolors teeth.
	Discolors teeth.
	Discolors teeth.
	Powerful caustic; must be used with care.
Follow with alkaline wash	Limit treatment and keep drug confined.
Wash mouth with sodium bicarbonate solution.	Dangerous.
Follow with alkalizing solution.	Dangerous caustic.
	Of questionable value.

A New Cast Bridge Technique

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THE TECHNIQUE PRESENTED here is designed primarily to eliminate the necessity of precariously soldering the separate units of a fixed bridge. The innovation consists essentially in taking a colloid impression of the wax patterns *in situ* in the mouth, pouring up the colloid impression in one of the certified refractory investments, and subsequently, investing the essential portion of the resultant positive, appropriately sprued (burning out the wax) and casting directly into the resultant mold.

Some Common Sources of Error

The following are common sources of error in fixed bridge construction:

1. Distortion of wax pattern during removal from the preparation, resulting in a gold abutment which cannot fit the preparation.[1]
2. Imperfect seating of the gold abutments in the plaster impression, invariably reassembled in sections, resulting in an imperfectly fitting bridge.
3. Cracking of investment-model while separating from impression, especially in the weak edentulous area.
4. Soldering errors:
   (a) failure to join bridge units;
   (b) failure of solder to flow completely through the embrasures;
   (c) burning or rounding off of delicate unit margins;
   (d) cracking of investment during soldering;
   (e) comparatively weak joint;
   (f) slight distortion of bridge from contraction of solder.
5. Poorly carved restoration.

Technique

It is assumed that the walls of the prepared teeth are parallel, that there is extension for prevention, and that the preparation is sufficient for the stresses of mastication.

1. The field of operation may be kept dry with cotton rolls and a saliva ejector. The prepared teeth then are washed with tepid water, and all débris incidental to preparation is removed.

2. A cone of hard wax is softened over a flame, and with the apex directed to the deepest part of the preparation, gently but firmly pressed to place. Pressure is maintained until the wax has hardened, and the molecules have become locked in their new relationship.[2]

3. With a sharp wax carving instrument, all excess wax is carefully removed. A warm, but not hot, instrument may also be used. The wax pattern may or may not be carved to exact anatomic form at this point.

4. A slight modification may be desirable under certain circumstances. The indirect-direct technique may then be used. Complicated three-surface abutments might dictate recourse to a model. The condition of the tooth and the skill of the operator would determine this. A compound, trulastic or colloid tube impression of the preparation is made and poured up in one of the quick-setting stones. The wax patterns are made on these stone models and readapted in the mouth.

5. A small bead of wax is adroitly placed occlusally and proximally (Fig. 1) in order to insure accurate withdrawal of the patterns at a subsequent stage. In the case of an anterior bridge of three-quarter crowns, wax horns are applied at the linguo-distal and linguo-mesial aspects, in order to lock the pattern in the colloid impression and thus insure accurate withdrawal of the patterns.

6. From this point on, the technique really takes a radical turn. A suitable crown and bridge tray, which has been previously perforated with a bur (Fig. 2), receives a sufficient amount of the preheated colloid (from 7 to 8 minutes). The tray is brought to place in the mouth just as soon as the colloid has lost most of its heat, but while it is still impressionable. This is important, because, if it has too much heat, it may soften or even melt the wax patterns. The tray is held firmly in place, chilled further, and carefully removed in a straight occlusal direction.

The colloid impression will remove the wax patterns undistorted (Fig. 3) and will maintain the exact relation they had in the mouth. The judicious placing of the accessory wax beads, occlusally, proximally, or lingually will affect the result here.

7. At this or an earlier stage, a plaster or colloid impression of the opposing teeth is taken and poured up in stone to be used later in determining the occlusal contour of the proposed bridge.

8. With a small sable or camel's hair brush and a solution of hydrogen dioxide and liquid green soap, the saliva and any blood is removed from the wax patterns embedded in the colloid impression. Room temperature water is then allowed to flow gently over the impression.

9. The colloid impression with patterns still embedded is now prepared to receive a thick creamy mix of cristobalite model investment (Fig. 4). The proportions used are 40 parts room temperature water to 100 parts investment (by weight), mechanically spatulated to produce a homogeneous mix, a strong model, and the maximum setting expansion.

10. A pointed camel's hair brush, moistened, is dipped into the mix, and the colloid impression is carefully painted, the investment being blown around and out several times in order to prevent trapping surface air or water. First, the pattern areas are carefully filled. The investment is gently pushed ahead of the brush. Then, the remainder of the mix is poured into the impression and allowed to set for about 22 minutes.

11. In order to facilitate the easy recovery of the essential portion of the ensemble, before the balance of the mix is poured, an appropriate size

[1] Sturdevant, R. E.: A Simple Control for Practical Castings, J. A. D. A. 24:231 (February) 1937.

[2] McGehee, W. H. O.: Text-Book of Operative Dentistry, Philadelphia, P. Blakiston's Son & Co., Second Edition, 1936.

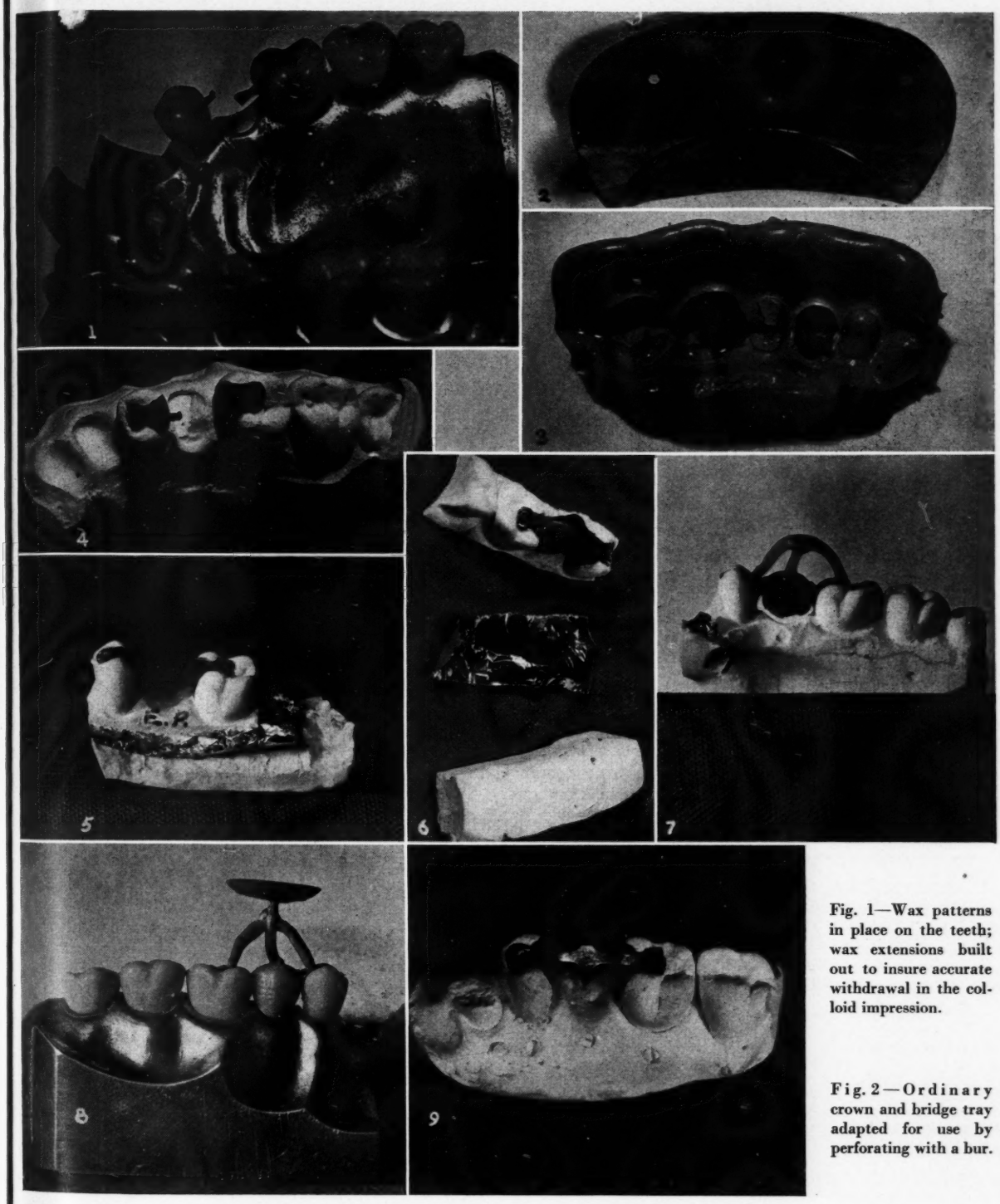

Fig. 1—Wax patterns in place on the teeth; wax extensions built out to insure accurate withdrawal in the colloid impression.

Fig. 2—Ordinary crown and bridge tray adapted for use by perforating with a bur.

Fig. 3—Colloid impression showing wax patterns in place. A section of the colloid has been removed to show wax extension grip.

Fig. 4—Model recovered from colloid impression, showing one wax grip still in place.

Fig. 5—Model dissected to show the relationship of the tin foil to the essential portion (E.P.)

Fig. 6—Model dissembled very simply.

Fig. 7—Model showing tin foil junction, proper thickness of investment over edentulous area, and method of sprueing the three units.

Fig. 8—Cast and pickled, but unfinished bridge in place showing beautiful embrasures.

Fig. 9—Model showing flat metal strip still attached to both wax patterns.

sheet of tin foil (60 gauge) is placed over the investment-covered patterns, and the remainder of the mix is poured over this tin foil (Fig. 5). It is important that a sufficient thickness of investment under the tin foil will provide about one-eighth to one-fourth inch thickness over the edentulous area. Later, when it becomes necessary to recover the essential portion for purposes of investing and casting, separation is facilitated by the presence of the tin foil (Fig. 6).

12. After setting 22 minutes, the colloid impression is easily removed and the working model recovered. By means of the previously obtained stone model of the opposing teeth, and aided by a crown and bridge articulator the replacing tooth is prepared and waxed to form in the edentulous space. At this stage, any additional carving, removing of accessory beads, and smoothing are done.

13. The units are now "soldered" simply by carefully passing a heated bladed instrument through the wax interproximal spaces.

14. The wax-model ensemble is now dressed for investing. The essential portion of the investment model is recovered by carefully cutting away all surplus, or, simply, by carefully introducing a sharp-bladed instrument into the tin foil junction and separating.

15. The essential portion is first moistened, sprued, and attached to the crucible former. Short, thick sprues are recommended. Accessory sprues extend from this main sprue in extensive restorations of three or more teeth. In order to prevent contraction and porosity in extensive cases, it is recommended that accessory sprues reach each unit, (Fig 7). The particular case and a knowledge of the behavior of casting gold will determine the design of the sprues. Generally speaking, each sprue should be attached at a point of greater bulk.

16. From this point on, the procedure is the same as for the orthodox technique of bridge construction. Briefly, the ring is placed over a low flame or in an open electric furnace (low heat) until the moisture is dissipated, whereupon the heat is rapidly increased. When the aperture in the bottom of the crucible shows a cherry red a little more than sufficient gold is preheated, the ring quickly brought to the casting machine, the gold melted and the bridge cast in one piece (Fig. 8). The amount of gold left in the button should be about twice the amount required for the bridge.

Advantages

1. The essential recommendation for this technique is that it eliminates the necessity of precariously soldering the separate units of a fixed bridge. Consequently, the technique eliminates the previously enumerated sources of error: (a) failure to join the bridge units; (b) failure of solder to flow completely through the embrasures; (c) burning or rounding off of delicate unit margins; (d) cracking of investment during soldering; (e) comparatively weak joint, and (f) slight distortion of bridge from contraction of solder. Solder, when it does flow, often flows to the gingival margins, thus making it impossible to finish off these margins. However, when the entire wax ensemble is prepared in one piece, as in the described technique, the shape of the embrasures and the extent of the contact can be predetermined by manipulation of the wax at this point, before investing and casting.

2. The technique incorporates the advantages of many of the conflicting crown and bridge procedures. It certainly facilitates a straight line, undistorted withdrawal of the wax patterns, and maintains the exact relationship of the patterns to each other and to the abutment teeth.

3. I think that the technique has a wax expansion merit. When the investment is poured into the colloid impression, with wax patterns embedded, the setting expansion of the investment is not counteracted by investment external to the patterns. The investment occupies the internal portion of the patterns; consequently, when the mix sets, its expansion (setting) is entirely confined to expanding the patterns. In the orthodox procedure, the creamy mix of investment flows both internally and externally to the patterns. With an expansion force acting on both sides, it does not appear that the wax pattern is itself effectively expanded.

4. The time-saving feature of the technique is a factor in its favor. Without attempting to speed the technique, I was able to carry a three-tooth fixed bridge from wax patterns to pickling in about 3 hours. In other words, a patient, sitting for preparations and wax patterns, can step out to a movie, return to the dental office about 3 hours later, and have his bridge cemented to place permanently. (If the case is one for immediate placement, i.e., where the bridge is first constructed and the indicated teeth subsequently extracted,

(*Continued on page* 440)

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1. ABOUT WAXES (Soft, Medium, and Hard):
   Waxes become plastic between 104° F. and 122° F.
   If the colloid when used for wax impression purposes has a temperature below these figures, there can be no possibility of pattern distortion from heat.
2. ABOUT CAVOSURFACE JUNCTION:
   The most essential part of any restoration in fixed bridgework is the relationship of the gold to the tooth at the cavosurface region. In the radical technique described, when dressing the wax ensemble, a slight excess fringe of wax can extend from the marginal outline onto the investment model of the teeth. This excess fringe, after the wax has been dissipated and the gold cast, is subsequently finished in the mouth, so as better to seal the peripheral approximation to the teeth. This procedure is optional, and is not an essential feature of the technique.
   Investment dust particles (from too rapid wax elimination) or carbon residue or both will often round off and shorten the delicate margins and thus contribute to a theoretical misfit. This wax fringe will absorb these sources of error, and thus will contribute to a better seal at the most vital part of the restoration, i.e., junction of abutment to preparation.
3. ABOUT BAKING PORCELAIN:
   When cast in one piece, it becomes possible to bake porcelain wherever advisable in order to improve the esthetics. For instance, when the joints are cast, as in this technique, pink porcelain can be applied interproximally on extensive anterior bridges where gingival spaces permit light to strike against gold to reflect a darkness. This service would be a rather difficult one to perform if the bridge units were soldered.

The Editor's Page

HOWARD R. RAPER, internationally known in the field of roentgenology, has gone slightly out of his ordinary field to do some pioneering. His report in this issue of a case of severe cellulitis following tooth removal treated by sulfanilamide is complete, authoritative, and a definite contribution to the dental literature. The chemotherapy of sulfanilamide was first described in 1935 by Domagk[1] who reported the use of the dye in the treatment of virulent hemolytic streptococci infection. The drug fulfills the requirements for any safe chemotherapeutic agent in that it controls disease by chemical disinfection or by the inhibition of pathogenic bacteria without serious toxic effects on the patient. On both experimental animals and human beings the toxicity of the drug is remarkably slight. Other infections, notably gonorrhea, have been treated successfully with this new drug.

The refined product now in use is a white crystalline substance. The original product, Prontosil, was a dark red dye.

The mechanism of action of sulfanilamide is apparently obscure. *In vitro* experiments showed only slight evidence that the drug directly kills streptococci. It would appear, therefore, that it is not bactericidal *per se*. Some investigators believe that the drug exerts some sort of a stimulating action on the reticuloendothelial system. Others believe that the drug acts to stimulate the white blood cells which in turn destroy the bacteria by phagocytosis. It would appear from the evidence presented by Long and Bliss[2] that the drug was only potent in the presence of frank infection. That is to say, the drug appears to have no prophylactic powers whatever. It does not, therefore, seem to build up any powers of resistance or immunity against attack. It has only been used to destroy bacteria that have already been engrafted upon the host. This limitation should be thoroughly understood.

A word of warning must be sounded regarding the use of this dye. It is an aniline derivative, and aniline products are notorious for producing changes in the hemoglobin molecule. It must also be remembered, as the Council on Pharmacy and Chemistry of the American Medical Association has pointed out, that an acidosis may sometimes follow the administration of sulfanilamide. Jaundice and urticaria have also been reported as following the administration of this drug. The lassitude and dizziness reported, and the visual disturbance mentioned in Doctor Raper's case are probably of a transitory nature.

The Council on Pharmacy and Chemistry[3] is particularly urgent in its warning that patients under treatment with sulfanilamide do not receive magnesium sulphate as a cathartic because of the danger of an increase of acidosis. It is well known and has been pointed out many times in the literature that certain drugs exert a powerful destructive force on blood cells. It is within the region of possibility that a severe granulocytopenia or other major blood dyscrasias may follow the use of sulfanilamide as such blood dyscrasias have followed the use of coal tar products. In any therapy in which this drug is employed extensively, it is imperative that periodic blood examinations be made before and following the administration of sulfanilamide to record any change in the blood picture, particularly the lowering of the white cell count.

Doctor Raper suggests that this drug may have possibilities in the treatment of periodontal disease with pus formation. The use of local applications of a solution of sulfanilamide in the experimental treatment of periodontal disease should be without danger inasmuch as 75 grains a day can be tolerated by adults; however, no one has any evidence at the present time that local application has any value. In fact, at this time, both intraspinal and intravenous administration of solutions of the drug are experimental and no evidence is available regarding the effectiveness of such treatment. In severe cases, such as postoperative infections following tooth extractions, the drug is given by mouth. Dentists should be warned that in those cases in which the drug is given internally, the administration should be under the supervision of a physician experienced in the use of sulfanilamide.

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[1]Domagk, Gerhard: Ein Beitrag zur Chemotherapie der bakteriellen Infectionen, Deutsche med. Wchnschr. 61:250 (Feb. 15) 1935, quoted in an Editorial, Chemotherapy in Streptococcic Infections, J. A. M. A. 108:48 (January 2) 1937.

[2]Long, P. H. and Bliss, Eleanor A.: Para-Aminobenzenesulfonamide and Its Derivatives, J. A. M. A. 108:32 (January 2) 1937.

[3]Council on Pharmacy and Chemistry: New and Nonofficial Remedies, J. A. M. A. 109:358 (July 31) 1937.

The Use of Sulfanilamide in Postoperative Acute Cellulitis

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WHAT FOLLOWS HERE is more than just another case report, for it deals with significant medical news of our day, the use of the new bactericide, sulfanilamide. Not since man first sniffed nitrous oxide gas and ether, nearly a century ago, and found that by so doing he could induce a sleep so sound that a leg could be cut off without the sleeper feeling it, has a chemical drug so captivated the imagination and astonished those who have used it.

Sulfanilamide is made from a red dye. The chemical name is para-amino-benzene-sulfonamide. It reaches us for oral administration in the form of 5-grain tablets somewhat similar in appearance to aspirin tablets. A forerunner of sulfanilamide, known as prontosil, was first used in Europe. For the last two years, starting with a paper by Domagk, February 15, 1935, reports, based both on animal experiments and clinical practice, of its effectiveness as a bactericide and bacteriostat for septicemia have been reaching this country. It was at first thought that its efficiency was limited to hemolytic streptococcic infections. but recent developments indicate that its usefulness is by no means confined to this type of infection alone.

It can hardly be said that it was introduced into clinical practice in this country before about six months ago. Already there are reports, some fragmentary and vague, but others deliberate and reliable, of its use in the following diseases: septic sore throat, puerperal fever, meningococcic meningitis, streptococcic meningitis, erysipelas, gonorrhea, pneumonia, scarlet fever, brain abscesses, and typhoid fever. Weinberg, Mellon, and Shinn[1] report the recovery of two successive cases of streptococcic meningitis, a disease with a mortality rate of nearly 100 per cent. Dees and Colston[2] report on its use in nineteen cases of gonorrhea. No treatment was given except the administration of sulfanilamide by mouth, and the results attained were such as have never before been reported. Doctor Colston is quoted as saying, "Nothing has been discovered which has as much promise. Nothing has ever been tried in treating gonorrhea which has given the results this has." Schwentker, Gelman, and Long,[3] reporting on ten cases of meningococcic meningitis, remark: "After the first two patients had been treated, the drug was used in every case admitted for meningococcic infection." Evidently the results in those first two cases made a profound impression. Nine of the ten patients treated recovered; one died of pneumonia.

The general opinion of those who have made use of the drug may be summed up by quoting Helmholtz: "We have only scratched the surface of the potentialities of sulfanilamide. The results to date have been so startling as to be fantastic. We still don't know what this new drug really can do . . . "

Report of Case

The patient, a man, aged 28, 5 feet, 11 inches tall, and weighing 155 pounds, was first seen in consultation on June tenth. He was apparently in good general physical condition except for the existing cellulitis. He was of the red-haired, red, thin-skinned type.

Examination—There was third degree swelling on the left side of the face in the third molar and submaxillary regions. The odor was pronounced, and characteristic of neglected broken jaw cases and severe infections of the mouth and jaws. The mouth could be opened only about an eighth of an inch. Swelling in the pharynx was so extreme that the patient experienced great difficulty in swallowing and talking. The necessity for establishing external drainage seemed imminent.

History—A lower left third molar had been extracted three days previously. There were no distressing symptoms the first postoperative day. On the second day there was some swelling and pain but nothing extraordinary. Postoperative treatment had been given and the patient was advised to return the next day if he were no better. On the third day the symptoms were as described when seen on consultation.

The patient had presented himself on April 22, 1937, with an inflammatory condition existing about the lower left third molar. The usual preoperative treatment had been given on April 22, 23, 26, 30 and May 3. During the thirty-five days following the last preoperative treatment until the tooth was extracted, that is, from May 3 to June 7, symptoms had remained quiescent. There was nothing unusual about the operation itself. The tooth set buccally, the occlusal surface presenting itself upward. Smears for Vincent's infection were not made.

On inquiry, it was learned that the patient had had an operation for rectal abscess four months previously and that a fistula still persisted. There was a history also of a Vincent's infection six

TABLE 1—Farhenheit Temperature Chart

	6/10 1st Day	6/11 2nd Day	6/12 3rd Day	6/13 4th Day	6/14 5th Day	6/15 6th Day	6/16 7th Day
Maximum	104°	103°	101°	99.6°	98.6°	98.0°	97.6°
Minimum	102.2°	100.6°	99.8°	97.4°	98.2°	97.8°	97.6°

[1]Weinberg, M. H.; Mellon, R. R., and Shinn, L. E.: Two Cases of Streptococcic Meningitis Treated Successfully with Sulfanilamide and Prontosil, J. A. M. A. 108:1948 (June 5) 1937.

[2]Dees, J. E. and Colston, J. A. C.: Sulfanilamide in Gonococcic Infections, J. A. M. A. 108:1855 (May 29) 1937.

[3]Schwentker, F. F.; Gelman, Sidney; and Long, P. H.: The Treatment of Meningococcic Meningitis with Sulfanilamide, J. A. M. A. 108:1407 (April 24) 1937.

years before which had proved so resistant to treatment over a period of three months that it became necessary to give arsphenamine to effect a cure.

Prognosis—It was decided to test the efficacy of sulfanilamide in this case of formidable postextraction infection. If further serious development could be averted and a cure effected in a reasonable length of time, it would give substantial proof of the effectiveness of sulfanilamide. There was little likelihood of recovery in less than two or three weeks, at best.

The patient was fully apprised of the experimental nature of the use of sulfanilamide and advised to go to the hospital where he could be kept under careful observation while submitting to the treatment. Doctors Hannett and Riley of Albuquerque had been using sulfanilamide in some of their medical cases; they were, therefore, called in consultation and they supervised the administration of the drug.

Temperature and Blood Counts—The patient entered the hospital at 2 P.M. with a temperature of 101.6° F. By seven o'clock, the temperature had gone up to 104° F. A further record of the temperature is given in the accompanying chart.

The blood count on entering was 3,900,000 red blood corpuscles; 17,000, white.

It will be observed in Table 1 that the temperature started to fall the second day and continued to do so until the fifth day when it became normal and did not rise above normal again.

Extra-oral roentgenograms were made to rule out the possibility of supernumerary teeth, odontomats, fracture, bone involvement, or other complications. All observations were normal.

Treatment—Administration of sulfanilamide was started at 4 P.M. the first day of admission to the hospital. Ten grains (two tablets) were then given every four hours, day and night, for eight doses. The dose was then reduced to five grains every four hours, day and night, for nine doses. The total dosage was 125 grains in sixty-eight hours. (One dose was skipped to avoid waking the patient at 4 A.M.) The administration of sulfanilamide was discontinued at noon on the fourth day.

The socket was irrigated daily with a physiologic solution of sodium chloride. Hot packs of a saturated solution of magnesium sulphate were applied at intervals during the patient's waking hours for the first three days.

Symptoms—Dizziness, lassitude, cyanosis (so slight as to be questionable), and disturbed vision were noted on the third and fourth days. These symptoms were probably due to the toxic effect of the drug. On the fourth and fifth days the patient complained of occipital headache. None of these symptoms were especially severe.

For convenient correlation of the temperature and the administration of sulfanilamide, a comparison of Tables 1 and 2 may be made.

Course—After the temperature of 104° was reached at 7 o'clock on the evening of the first day, no symptoms grew worse. The process seems to have been definitely arrested.

TABLE 2—Medication Chart

Drugs	6/10 1st Day	6/11 2nd Day	6/12 3rd Day	6/13 4th Day	6/14 5th Day	6/15 6th Day	6/16 7th Day
Sulfanilamide	30 grains (3 doses)	55 grains (6 doses, 1, 5 grains)	25 grains (5 doses)	15 grains (3 doses)			
Codein		1 grain (2 doses)	1½ grains (3 doses)	½ grain (1 dose)			
Acetanilid				5 grains	20 grains (4 doses)		
Acetylsalicylic Acid				10 grains			
Agar Mineral Oil			½ ounce	1 ounce			

Improvement in local symptoms was noticeable by the third day. Swelling was slightly less and the patient could speak and swallow with greater ease. By the fifth day he could speak naturally and chew his food in reasonable comfort.

A small amount of drainage through the socket started on the third day and continued, increasing in amount for two days but never becoming great. Drainage diminished rapidly and had almost ceased by the seventh day. It was watery in character and of a greenish color. Cultures were made. There was no growth at the end of twenty-four hours. Growth at the end of forty-eight hours showed the predominating organism to be *Streptococcus viridans*. The accompanying organism was *Staphylococcus aureus*. A blood culture taken on entering the hospital was reported negative.

It was suggested that the patient leave the hospital on the fifth day, but he expressed the wish to stay until he could return to his home in Santa Fé and to work. He was accordingly held two more days and dismissed on the seventh day, at which time swelling was confined to an enlargement, about the size of a walnut, of the submaxillary lymph glands.

The patient was seen again in the office two days following his dismissal from the hospital. Only a small knot remained in the gland, and the patient considered himself well. The socket appeared clean and healthy. When he was seen again one week later, the patient appeared perfectly well, and the adenitis had disappeared.

Comments

1. *Drainage*—It will be noted that drainage started on the third day, and the question arises as to whether or not the improvement in symptoms from there on was not due entirely to evacuation of pus. But there was improvement in symptoms *before* perceptible drainage occurred and the amount of improvement was out of proportion to the amount of drainage. We have observed other cases in which so little drainage brought little if any improvement and continued for weeks.

2. *Watery Discharge*—As has been recorded, the pus was watery in character. We believe this is rather characteristic of a *Streptococcus viridans* infection, but inasmuch as so little is known about the exact action of sulfanilamide, we wonder whether one of the effects of its use may be to render pus more fluid and so promote drainage.

3. *Fever*—In view of the fact that fever is one of the items listed as a possible reaction from the drug itself, the question arises as to whether or not the elevation of temperature in

the case reported may have been due to the drug and not to the infection. The answer seems simple. At the time the temperature reached its peak of 104° the patient had received only one 10-grain dose of the drug, and as further doses were given and the cumulative drug effect reached its maximum, the temperature dropped.

4. *Hot Packs*—Despite the satisfactory end-results, the use of hot packs is open to criticism. Ice packs were started, but gave the patient so much distress that they were promptly discontinued and the hot applications substituted. The hot packs were continued because the effect seemed entirely salutory.

5. *Effect on Rectal Fistula*—It will be recalled that there was a rectal fistula in this case which had been discharging for four months. If the sulfanilamide had the effect we thought it had on the jaw condition, it would seem that it should also have had some effect on the discharging fistula at the other end of the alimentary canal. And so it did. Discharge from the fistula ceased the last day of hospitalization and had not recurred when the patient was last seen nine days later.

Following this case, Doctors Hannett and Riley used sulfanilamide in a case of postoperative infection with high temperature following tonsillectomy. Results were similar to those attained in the dental case reported here.

Conclusions

1. If we erred in our diagnosis and prognosis and the case was not the serious one we thought it to be, then the prompt recovery is without significance. As evidence that we were probably not mistaken, it should be recalled that the patient had a temperature of 101.6° F. on entering the hospital at 2 o'clock and that in five hours it rose to 104° F. This would seem to indicate not only that he was ill at the time we saw him at noon but that his condition was becoming worse rapidly.

2. If we did not err in our diagnosis and prognosis, the quick recovery is remarkable and was probably due to the administration of sulfanilamide.

3. We cannot conclude with finality either that sulfanilamide cured this patient or that it may be depended on for cure in similar cases. On the other hand, until further evidence is gained from its use in similar cases, we may reasonably presume that sulfanilamide effected the cure.

4. We believe we are justified in advising the use of sulfanilamide in similar cases and we urge that all such cases be reported as promptly as may be practical in order that we may accept the method as routine treatment, discard it, or weave it into its place with older methods, depending on the records. We further urge those who would employ this treatment first to acquaint themselves with the literature on the subject, or call in consultation some colleague with such knowledge and, if possible, some degree of clinical experience. It would be well at this stage for the dentist and physician to work together.

5. If it is found that sulfanilamide may be depended on to give results similar to those apparently attained in the reported case, the serious hazard of postoperative infection following tooth extraction which has always hung over both patients and operators may be largely eliminated.

General Comments

Physicians are afraid of sulfanilamide; afraid it may not actually have the curative qualities it seems to have; afraid of its possible toxic effects. What will happen to Doctor Colston's cured (?) gonorrhea patients within the next year? Will there be a recurrence of the disease? Will all or most of the patients develop rheumatism? Has the drug itself done some harm that has not yet manifested itself but is destined to do so later? Will patients who have had large doses of sulfanilamide ultimately develop agranulocytosis and die? These questions and many others worry all conscientious men interested in the subject.

Conservative clinicians, fearing the danger of recurrence of the disease after it has been halted in its progress and apparently cured, try not to discontinue the use of the drug too soon and habitually hold themselves in readiness to recontinue its use when necessary. In the case of our own patient, we feel that there is no danger of recurrence, because it was inaugurated by the trauma of a surgical operation. It might recur, probably would, in the event of another extraction.

Toxicology—Various writers have enumerated numerous toxic effects from giving the drug in the necessary therapeutic doses. These effects range from nothing more serious than slight dizziness and lassitude to transient anemia and agranulocytosis. A fairly complete list of possible ill effects enumerated by various authors now follows: lassitude, dizziness, nausea, loss of appetite, cyanosis, skin eruptions, arthralgia, acidosis, fever, kidney irritation, methemoglobinemia, sulphemoglobinemia, neutropenia, and agranulocytosis.

On questioning, we discovered a symptom in our patient, probably an ill effect of sulfanilamide, which seems ordinarily not to be reported. We find it mentioned only once, in a case of meningitis. We refer to visual disturbance. The patient was unable to see objects clearly either at a distance or close range. He also complained of occipital headache starting on the fourth day when the content of sulfanilamide in his system was at its peak.

We would point out that dizziness, lassitude, slight nausea and occipital headache constitute the characteristic syndrome of eye disturbance, and suggest that possibly the toxic action of sulfanilamide may be primarily one of visual disturbance, and that the symptoms are brought on indirectly in this manner.

With such a long and discouraging list of possible ill effects, the drug may appear to be an extremely toxic one, but if this is true, the fact is not established. Some of the items on the list one seldom encounters and some probably are only fears. Colston states, "Sulfanilamide is relatively non-toxic," and reports having given as much as a hundred grains ("1 Gm. for each 20 pounds of body weight") a day, daily, "for as long as a month without serious ill effects."

Dosage—The dose varies according to the patient and the disease to be treated. The maximum daily dose is ordinarily figured on the basis of 1 Gm. (15.43 grains) per

each 20 pounds of body weight. Such large doses should be administered only by those who have made a thorough study of the subject and are prepared to meet emergencies.

One manufacturer gives conservative advice for dosage as follows: "Three 5-grain tablets of sulfanilamide at four-hour intervals may be considered a maximum dose, and this should be reduced within the first 24 to 48 hours to two or one 5-grain tablet every four hours. The full therapeutic effect of the drug may usually be expected to occur within the first two or three days after initiating treatment with sulfanilamide."

The optimum concentration of sulfanilamide in the blood is thought to be a dilution of 1:10,000. When this concentration is attained, it may then be maintained with as little as three five-grain tablets daily. Although we are unfamiliar with the nature of the technique involved, we understand that a qualitative blood test has been developed and if not too complicated and expensive, it would seem the ideal method of regulating dosage. As yet, clinicians depend mainly on the symptoms of dizziness and lassitude as a basis for regulating dosage, reducing the dose or discontinuing it for a day or two when these symptoms become too pronounced.

Disappearance of symptoms ordinarily occurs promptly upon discontinuance of the drug. If they should not, Colston advises a "complete blood study." In renal insufficiency there is particular danger of excessive cumulative effect.

Our dose in four days was only 125 grains. Colston gives as much as 500 grains in nine days. In cases such as ours, perhaps ten grains for each 20 pounds of body weight might be sufficient for a maximum daily intake. We did not give this much. Ten grains per each 20 pounds of weight is easy to remember, being one-half grain per pound. Maximum daily dosage on this basis would be, in grains, simply: one-half the body weight.

Weinberg and Mellon[1] summarize the present status of the subject of dosage thus: "The question of dosage and method of administration cannot be answered definitely as yet. The drug does not seem to be very toxic, so it is rather safe to use."

Most writers warn of the necessity of caution and emphasize the fact that the use of this drug is still in the experimental stage. "An emphatic warning should be sounded as to the possibility of reactions from this drug," says Colston; and then adds, "as should be done, of course, in the clinical use of any new drug or treatment."

Modes of Administration — The most popular and probably the best mode of administration is orally. It has, on occasion, also been given intradermally, intramuscularly, intravenously, by rectum, and, in the case of meningitis, intraspinally. It has also been used locally in a saturated solution (0.8 per cent).

Action—Just exactly how sulfanilamide exercises its curative effect is not known. Three theories are advanced: (1) by direct action on the bacteria; (2) by stimulating phagocytosis; and (3) by rendering the tissues themselves a less favorable culture medium. There is evidence both in support of and in contradiction to all these theories.

Use in Dentistry—Conditions met with in the practice of dentistry for which sulfanilamide may be and doubtless will be tried are: Postoperative infection, osteomyelitis, streptococcic stomatitis, Vincent's infection, pyorrhea, the treatment of infected pulp canals, as a local antiseptic, as a palliative, a cure, or an agent of diagnosis in cases of metastatic infection stemming from dental focal infection. It is too much to expect, even of sulfanilamide, that it will prove effectual for all the conditions for which it is destined to be tried. To date, we have no reports of its beneficial use in chronic conditions, with the exception of gonorrhea. For this reason, as well as others, there seems no particular promise that it may prove effective in the treatment of pyorrhea. Time and experimentation alone will tell what the results are to be in this field.

Recently, the newsmagazine, *Time*,[4] handled the sulfanilamide news in a thoroughly competent and intelligent manner, and likewise sounded the warning of possible dangers. This article, has given impetus to investigation. *The Journal of the American Medical Association* will undoubtedly imposed a rigid censorship[5] of the articles offered for publication in its pages in order to keep the probable coming confusion at its minimum. To follow the information given in that journal, we feel, is the safest course to pursue. The drug has already been accepted as a remedy for septicemia by the Council on Pharmacy and Chemistry of the American Medical Association.

1515 *East Silver Avenue.*
First National Bank Building.

[4]Time, Newsmagazine, Medicine Section, 29:63 (May 17) 1937.

[5]Mellon, R. R.; Gross, Paul; and Cooper, F. B.: Sulfanilamide and Prontosil in Hemolytic Streptococcus Infections, J. A. M. A. 108:1858 (May 29) 1937. Report of the Council on Pharmacy and Chemistry of the American Medical Association, ibid., page 1888.

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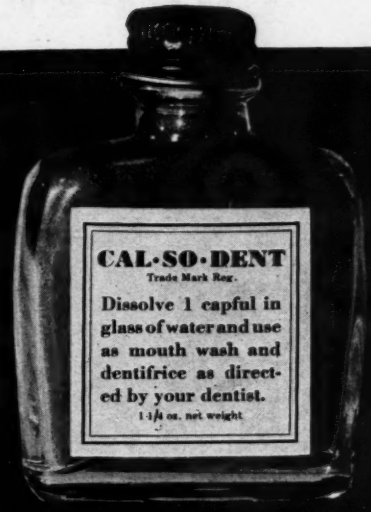
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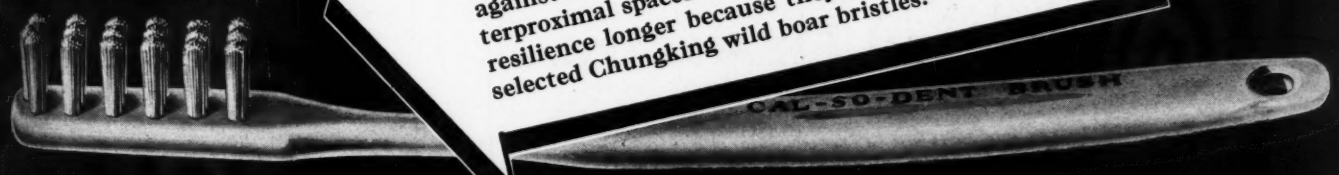

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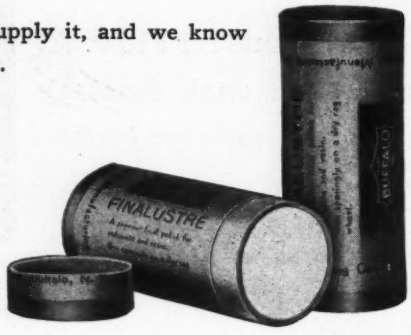

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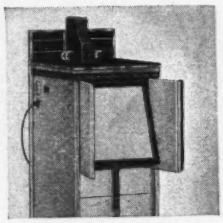

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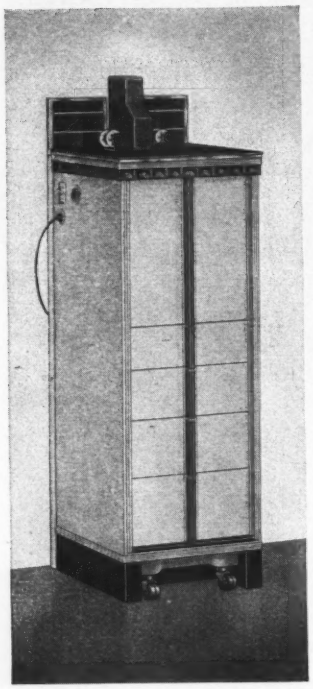

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TO THE *Editor*

Dentistry for Children

I never fail to read your editorials and invariably find them inspirational. Your editorial in THE DENTAL DIGEST for July, 1937, however, cannot be passed without criticism; first, because it offers an excuse for poor dentistry for children, and second, because it is not a stimulus to dentists to make an effort to do better children's dentistry.

A "squirming, squalling, uncooperative child" is not any more necessary than a squirming, uncooperative adult. It is no more difficult to use the agents that we have at our command to eliminate pain for the child than it is for the adult.

Proper cavity preparation and proper restoration are not so difficult in the deciduous dentition as in the permanent, provided the dentist is as efficiently and adequately trained in operative dentistry for the child as he is for the adult. The pulp of the deciduous tooth is not so easily irritated as the pulp of the permanent tooth, and, with proper medication and insulation, will not give unfavorable results.

You state that "Deciduous teeth that have been restored frequently have dead pulps and so-called gum boils," which is true when the dentist lacks the knowledge of proper cavity preparation and has not given sufficient study to the size, shape, and relative position of the pulp in the deciduous tooth. You further state, "In the same mouth teeth that have gone untreated sometimes do not produce symptoms." In the first instance an infected tooth has been sealed; therefore, Nature arranges drainage by the so-called gum boil. In the second instance, untreated teeth are just as virulent and have as serious an effect on the child's health because drainage is taking place through the root canals into the mouth instead of through the gum boil. In addition, this untreated tooth offers protection in its open cavity for

all manner of infection and decomposed food stuffs.

It is NOT a fact that "Unless the child is brought to us early, we can do him little good." Neglected caries in the deciduous tooth is no more inoperable a condition than in the permanent tooth. For the child as well as for the adult, inlays and crowns, bridges and dentures can be made to replace missing teeth, but it is only rarely necessary to resort to these measures in the child's case. Silver amalgam and gold are materials that are extremely well suited to deciduous teeth when properly handled. We must modify our principles of cavity preparations for deciduous teeth to have satisfactory results.[1]

I feel sure that the present day dentist caring for children is not causing the child to carry in the back of his mind a dental neurosis, nor is he using the antiquated, out-of-date, so-called towel method. This method was advocated a good many years ago and at the time was used with success by many; but through a better understanding of the child and a better knowledge of operative procedures and pain alleviation, these heroic measures are unnecessary.

The so-called nervous child may take a greater amount of time and a more intelligent understanding of behavior problems by the dentist, but can be made more tractable than the average child in one's practice, if properly handled. I agree with you that it would be better for a child to lose a deciduous tooth than to develop a neurosis, but neither one is necessary.

I am writing these comments to you as I believe editorials, such as yours in THE DENTAL DIGEST, July, 1937, will make it that much more difficult to awaken the dental profession to the fact that dentistry for children is no more difficult than dentistry for the adult but does require as much study and consideration as adult dentistry. Let us make prosthetic dentistry a forgotten part of our practices by learning how to do dentistry for children and operative dentistry for the adult. This cannot be done with a few hours' instruction in the dental colleges on children's dentistry and a practice after graduation in all *other* branches of dentistry.—Charles A. Sweet, D.D.S., *Oakland, California.*

[1]Sweet, C. A.: Cavity Preparation for Deciduous Teeth, THE DENTAL DIGEST 41:148 (May) 1935.

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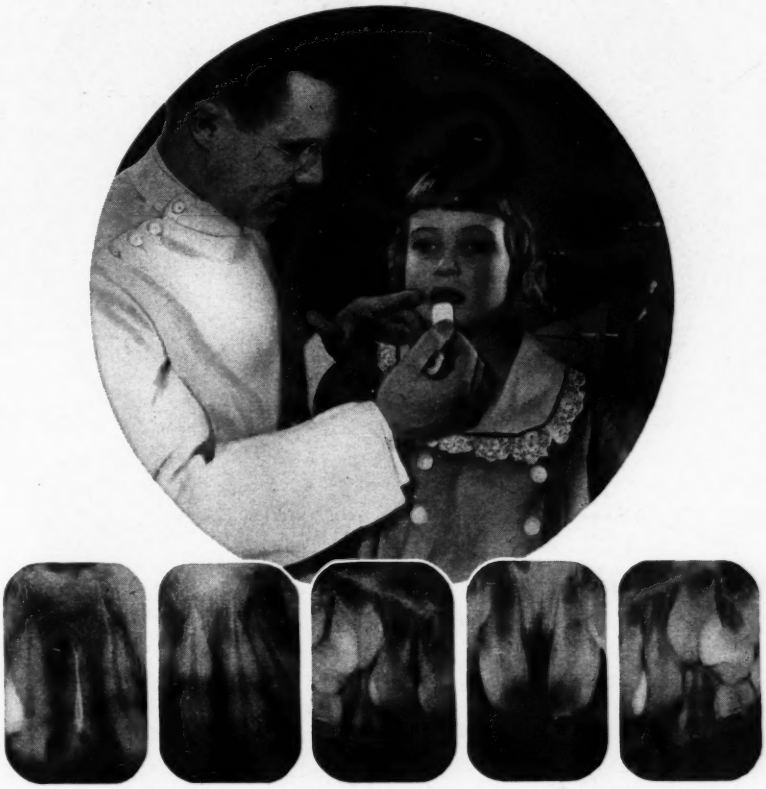

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I have recently had an experience in the legal collection of an account for professional services which proved conclusively to me the need for adequate dental records. I believe this incident will be of interest to you in the work you are doing on this matter.

In proving to the court the amount of work done and the attending fees charged, two of the Ryan Examination and Treatment Records were used in the presentation of this case. One chart was prepared as for routine mouth examination and the second showed the restorations placed subsequently.

A judgment was granted without question and the judge commented at length about the ease and clarity with which he, as a layman, could visualize exactly what had taken place in the patient's mouth.

—EDWARD G. ROBBINS, D.D.S., *Evanston, Illinois.*

Announcement of Books Received

A TEXTBOOK OF EXODONTIA (Exodontia, Oral Surgery and Anesthesia), Third Revised Edition, By Leo Winter, M.D., D.D.S., Sc.D., LL.D., St. Louis, The C. V. Mosby Company, 1927.

THE EXAMINING DENTIST IN FOOD HAZARD CASES, By Charles A. Levinson, D.M.D., Boston, 1937. Published by the author.

NUTRITIVE ASPECTS OF CANNED FOODS ("A bibliography of scientific reports, and helpful tables of food data."), Compiled by the Nutrition Laboratory, Research Department of the American Can Company, 1937.

SUPPLEMENTS TO THE PHARMACOPEIA OF THE UNITED STATES, Eleventh Decennial Revision, Easton, Pennsylvania, Mack Printing Company, 1937.

TEXTBOOK OF MEDICAL BACTERIOLOGY (Illustrated), By R. W. Fairbrother, D.Sc., M.D., M.R.C.P., St. Louis, The C. V. Mosby Company, 1937.

VOICE MANUAL (Illustrated), By George A. Brouillet, D.M.D., Boston, Bruce Humphries, Inc., 1936.

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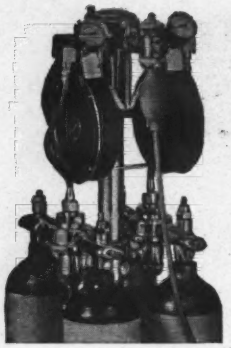

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Significant Excerpts from the Literature

[Ludwig's Angina Treated with Prontosil, Report of Cases in *The Dental Gazette*, 3:464 (April) 1937, Letters reprinted from *The British Medical Journal*.]

"A man, aged 28, who had put up with the pain for a week, was seen with an acute and very offensive alveolar abscess of the right lower jaw. Trismus was very marked, and so was edema of the parotid area. An X-ray showed a buried wisdom tooth, and on admission to our local hospital his condition was rapidly getting worse. Under gas and ether, with great difficulty, the tooth was extracted. Rigors followed, his temperature rose to 103°, and he became delirious and mentally confused. The edema went up to his right eye and down to the level of the thyroid cartilage, with marked inflammatory signs as well."

After three doses of prontosil (sulfanilamide) the patient's condition improved and symptoms subsided except for a slight rise in temperature which was immediately controlled by two more injections of sulfanilamide. Recovery was progressive and rapid. A swab from the alveolus showed streptococci but not the hemolyticus. —W. H. PALMER, M.B., B.S., *Hayle, Cornwall*.

"If prontosil or any similar preparation can be relied upon with a high degree of certainty to prove effective in severe septic conditions of a streptococcal nature, such as cervical cellulitis, then we have at our disposal an agent that will relieve the surgeon and conserve the already depleted powers of resistance of the patient by eliminating the necessity for operation, not to mention preservation of the neck from disfiguring scars . . . Since most of these cases are usually streptococcal, and often dental in origin, it would appear a wise thing in the early days or hours of onset to prescribe prontosil or similar preparation freely." A case of cervical cellulitis, successfully treated with prontosil, is reported.—H. LYTH, *Manchester*.

[Calcium Therapy in Dentistry, Editorial, J. A. M. A. 108:1655 (May 8) 1937.]

"The Council on Dental Therapeutics points out that the dentist is primarily interested in the following special aspects of calcium metabol-

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ism: 1. Are disorders of the teeth, notably dental caries, related to the dietary intake of calcium (and phosphorus)? 2. Is the development of sound teeth in utero dependent on a high intake of calcium during pregnancy? 3. Is there a calcium drain on the mother during pregnancy and lactation, and, if so, is this drain related to the carious process?

"... The dental council pointed out that there is no direct positive evidence from either the laboratory or the clinic that the addition of calcium and phosphorus compounds to an otherwise ample diet influences in any definite manner the incidence of dental decay in the child or in the adult, or that it promotes the development of noncarious teeth in utero, in infancy and during growth or in the adult; nor is there any sound evidence that a calcium drain during pregnancy and lactation is lessened by the addition of these compounds when the diet is well balanced.

"1. All the calcium and phosphorus requirements for average needs, including pregnancy and growth, may be suitably obtained by means of an adequate diet containing not only calcium and phosphorus compounds but also other necessary factors, such as caloric, protein and other mineral and vitamin requirements.

"2. There is no carefully controlled evidence that the addition of calcium and phosphorus compounds, whether inorganic or organic, promote retention of these elements and hence freedom from dental diseases, except in known cases of deficiency. Where this occurs, milk serves as an excellent source of calcium and phosphorus in a readily assimilable form.

"3. There is no evidence that the ingestion of combinations of calcium and phosphorus in addition to diets adequate in these elements promotes the development of sound teeth in the human fetus. The calcification of the teeth is a postnatal event."

The Trend of Dentistry

[Bryan J. Wood, L.D.S.Eng.: The Trend of Dentistry, The British Dental Journal, 62:407, 409, 410 (April 15) 1937.]

"The State, by prohibiting unregistered practice, has in the interest of public health conferred a virtual monopoly on the dental profession. That monopoly necessarily carries with it the responsibility of providing a satisfactory standard of dental treatment available to the whole population. This responsibility the profession can only discharge completely

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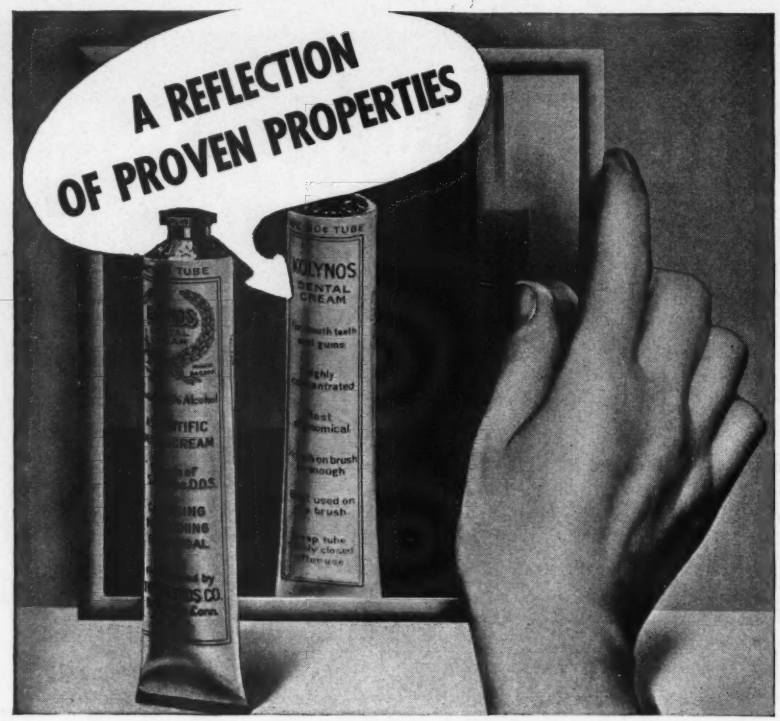

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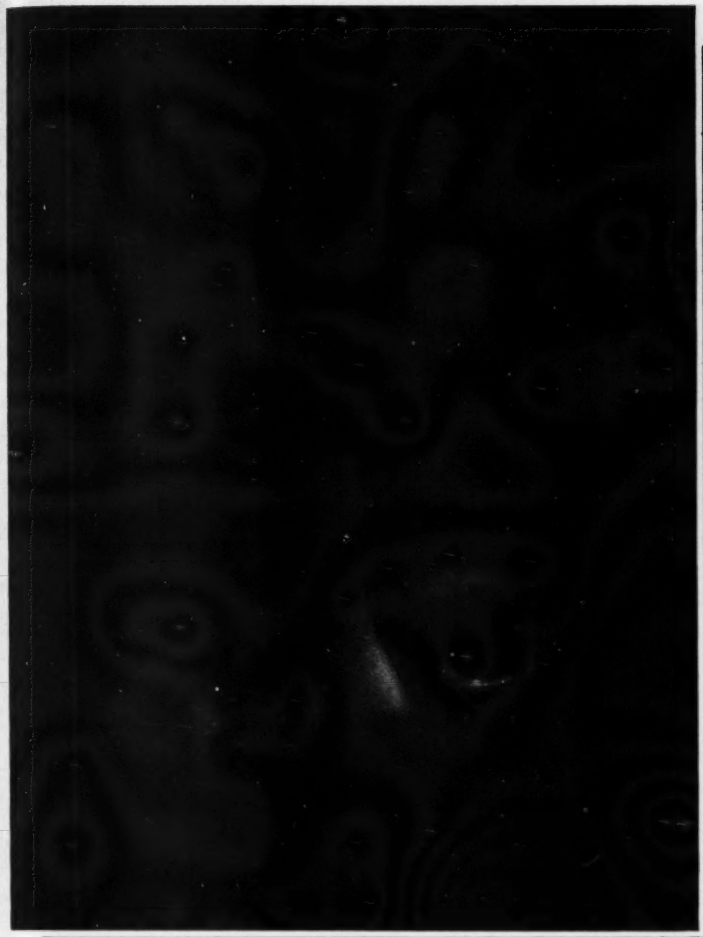
in co-operation with those public bodies which are responsible for the health services of the nation; but it is manifestly our duty, and equally manifestly to our best interests, to discharge our share of that responsibility, by indicating how best the deficiencies in the provision of necessary treatment, which we know exist at present, can be supplied, and to co-operate with those public authorities in securing the efficient working of such schemes for the provision of treatment as it may be found desirable to institute.

"This is not a new feature in the history of the profession, but we have only to cast our minds back to the period immediately prior to the Great War to realise how rapid the growth of Public Dental Service has been. There were then only a few school dentists, a few factory dentists, a handful of men up and down the country, working in Poor Law schools and institutions, and the prospect of dental treatment being ultimately available under the National Health Insurance Act was so remote as to excite little general interest.

"How different is the picture now! A rapidly expanding School Dental Service, employing in 1935 the equivalent of 646 whole-time officers, the Dental Service rendered in connection with Child Welfare and Maternity Centres, the Dental Branches of the three Fighting Services, the provision of Dental Benefit as an additional benefit, catering for the needs of some 12,000,000 insured persons, Dental Treatment under Public Assistance Committees, Municipal Dental Hospitals and a steadily increasing number of factory clinics.

"The present scheme of dental benefit, as an additional benefit, has undoubtedly brought dental treatment within the reach of a section of the community which previously had been unable to afford adequate fees, but since only a part of the cost is met by the Approved Society, some of those who are most in need of help to obtain treatment are, ironically enough, excluded from the benefit towards the cost of which they have, in part, contributed. It is also true that a proportion of the benefit goes to persons who have, in the past, been able, out of their own resources, to obtain satisfactory treatment, and would have continued to do so if dental benefit had not been instituted, so that we have to discount, to some



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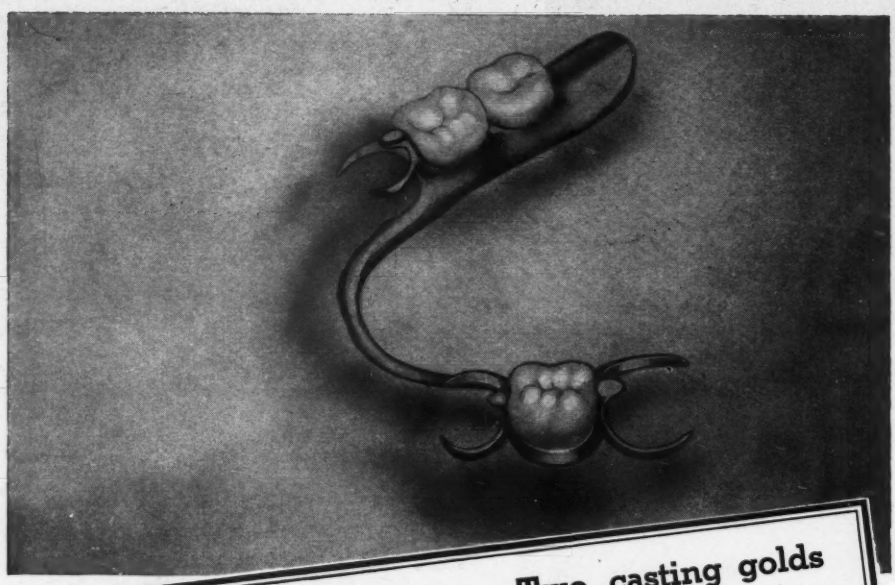

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THE DENTAL DIGEST

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extent, the apparent contribution made towards the provision of dental treatment by the institution of the Benefit. On the other hand we must recognise that the scheme does represent an honest attempt to extend the provision of necessary treatment as widely as is possible, within the bounds set by the finances of the Insurance Acts, and as such we have welcomed it.

". . . The fact that less than 10 per cent of the persons eligible for benefit apply for treatment in any one year is due, not to defects in the scheme, but rather to a lack of appreciation of the necessity for and the value of treatment—dentistry being looked upon as a means of curing pain, or of replacing teeth which have become so diseased as to be useless, rather than as a necessary part of preventive medicine. This tendency is well illustrated by an analysis of 10,000 dental letters, made by the Ministry of Health, which showed that 62 per cent of the patients concerned required dentures, 10 per cent repairs to dentures, and a further 10 per cent, the remaking of dentures—whereas only 48 per cent of these same 10,000 had fillings inserted, and 30 per cent required scaling. These figures are typical of the experience of all the big Approved Societies. They are a striking commentary on the state of the nation's teeth, and make it obvious that we have a long way to travel before the arrears of treatment can possibly be overtaken. It is also obvious that, so long as the demand rate remains at so low a figure as at present, the money which is being expended on Dental Benefit is being expended, not—as it might most fruitfully be—on early treatment, but rather on the treatment of the end-results of dental disease, a conclusion which is borne out by the fact that the average cost of treatment, under a Dental Letter contract is very little lower than it was when the scheme was first instituted.

"The most glaring defect of the scheme, from the point of view of dental health, is that treatment is not provided for the young entrants into Insurance, so that for somewhere about four years after a child leaves school there is no provision for any assistance being given towards the cost of treatment—this at the time when the need for treatment of a preventive character is at its highest